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REPORT OF THE LIGHT-HOUSE BOARD.

The annual report of the light-house board, just published, gives the following information:

There are under control of the light-house establishment the following named aids to navigation: Light-houses and beacon lights, 1,495; light-vessels in position, 49; light-vessels for relief, 11; gas-lighted buoys in position, 142; fog-signals operated by steam, caloric or oil engines, about 208; fog-signals operated by machinery (clockwork), about 242; post lights, about 1,813; day or unlighted beacons, about 683; whistling buoys in position, about 95; bell buoys in position, about 139; other buoys in position, including pile buoys and stakes in fifth and eighth districts and buoys in Porto Rican, Hawaiian and Alaskan waters, 5,212.

In the construction, care and maintenance of these aids to navigation there are employed: steam tenders, 42; steam launches, 3; sailing tenders, 1; light-keepers, about 1,569; officers and crews of light-vessels and tenders, about 1,372; laborers in charge of post lights, about 1,600; laborers and mechanics under light-house engineers, about 1,800.

As to new works, the act approved on Feb. 15, 1893, authorized the establishment of a number of light-stations at an aggregate cost of nearly half a million dollars, but made no appropriation at that time for their construction. Since then from time to time appropriation has been made for the erection of many of them. The following is a list of the light-stations remaining for which no appropriation has yet been made, with the maximum amount which each may cost: Bay State Shoal lights, New York, \$800; Fairport harbor fog-signal, Ohio, \$4,300; Lorain harbor (Black river) fog-signal, Ohio, \$4,300; Sand Hills light-house, Michigan, \$20,000; Bayfield light and fog-signal, Wisconsin, \$5,000; Pats (or Hat) Point light and fog-signal, Michigan, \$20,000; Wilson harbor light, New York,

\$2,500; Big Oyster Bed Shoal light and fog-signal, New Jersey, \$25,000; Deer Point light, Florida, \$1,000; New York Slough light and fog-signal, California, \$10,000; Willamette river, Oregon, 25 beacon lights and buoys between Salem and Portland, \$5,000.

The board repeats the statement made in former annual reports that the limited appropriation made for fog-signals was insufficient to permit all needed renovation and improvements in this important class of aids to navigation. Improved apparatus has been installed at several stations, preserving the system of interchangeability between the various members of the duplicate sets of apparatus required in each case.

The act approved on March 3, 1905, under the head of expenses of fog-signals, provides for the establishment of submarine signals. It will be necessary to increase this yearly appropriation if much is done in this direction, as the amount heretofore appropriated has been found insufficient for the proper maintenance of the fog-signal service. It is therefore estimated that \$235,000 will be required during the coming year for all expenses connected with fog-signals and it is recommended that an appropriation of that amount be made therefor.

The board made plans and specifications for a new light vessel, No. 82, to be used as a relief light vessel on the great lakes, in the ninth and eleventh light-house districts, for which an appropriation of \$30,000 was made by the act approved March 3, 1903. Bids for building this vessel were asked by advertisement, but were rejected as exorbitant, each being for an amount greater than the appropriation for building the vessel. The plans and specifications, which were made some time ago, when labor and material were not so high in cost as now, have been revised to meet the new condition of things, and bids for her construction will be asked at an early day. Light-vessel No. 89, to be placed off Martin's Reef, Lake Huron,

Mich., will be built from the same plans as will be light-vessel No. 82, to be used as a relief light-vessel in the ninth and eleventh light-house districts on the great lakes. Authorizations and appropriations having been made in part or in whole, the board has prepared plans and specifications for light-vessels Nos. 84, 85, 86, 87 and 88, respectively, to be stationed, four on the Atlantic coast and one on the Pacific, for the building of which bids have been asked.

The board has now under construction the tenders Tulip, Sunflower, Cypress, Anemone and Manzanita. Plans and specifications similar to the Tulip have been prepared, and bids therefor will be opened late in October. The board has asked an additional appropriation of \$75,000 to satisfy this authorized contract.

The Hawaiian light house establishment carries appropriations for range lights and post lights and the board has recommended the appropriation of about \$350,000 for various lights, depots, tenders and reimbursement of the Hawaiian government for moneys expended in maintaining its light-house establishment since becoming American territory and prior to the taking over of its service by the light-house board.

The act approved on March 3, 1905, provided, in the general appropriation for the expenses for fog-signals, for establishing submarine signals, whereupon the board instituted experiments resulting in an arrangement by which, from June 1, to August 1, 1906, a submarine signal bell was sounded from the light-vessels at Boston, Pollock Rip shoals, Nantucket shoals, Fire Island and Sandy Hook. Passing vessels fitted with apparatus for hearing submarine signals, were requested to note, when approaching any of those vessels, the distance and direction from which each submarine signal was first heard, how far it was carried, the direction and force of the wind, the condition of the sea or any other fact that would aid in determining the value of that particular signal as an aid to navigation.

Mariners are furnished with postal cards on which to make these reports and upon these replies will largely depend the action of the board. Experiments are still being made with submarine bells on other light-vessels, with the view of ultimately adopting them as a regular fog-signal if results prove them satisfactory.

FORE RIVER SHIP BUILDING CO.

The report of the directors of the Fore River Ship Building Co. is at hand and in commenting upon the past year's work, President Bowles brings out some interesting facts, the construction of the steamship terminal of the Birmingham & Atlantic railroad at Brunswick, Ga., being one of the projects now under way, which is mentioned in the report.

The annual meeting, held at Boston on Feb. 12, resulted in the re-election of the entire board of directors and officers, as follows: Directors, Gordon Abbott, Francis T. Bowles, Wallace B. Donham, F. C. Dumaine, William A. Gaston, Robert Winsor, Arthur Wainwright, William Endicott Jr., and W. C. Fish; executive committee, William Endicott Jr., Gordon Abbott, F. C. Dumaine, Francis T. Bowles and Wallace B. Donham; officers, Francis T. Bowles, president; H. G. Smith, manager; J. A. Sedgwick, treasurer and Samuel T. MacQuarrie, clerk.

The report of the directors is as follows:

"The directors submit herewith comparative balance sheet of the company as of December 31, 1906, and December 31, 1905. These statements show for the year an increase in the cash on hand of \$97,075.45; and an increase in the surplus of \$32,453.31, after setting aside \$200,000 as a reserve for turbine development. There has also been a gratifying increase in the quick assets. The gross cash receipts of the company for the year were \$5,512,169.43

"Additions to the plant and machinery were made during the year to the amount of about \$65,000, including two small pieces of real estate adjoining the plant and a marine railway capable of hauling out moderate size vessels for repairs. All items of repairs have been charged to expense, and \$120,000 has been charged off for depreciation. All the company's bills have been paid as soon as they were due and approved, and the present accounts payable represent only current items not due. No money has been borrowed during the year, and the company has no notes payable. The

accounts receivable are believed to be worth in every instance their full value. At the present time your directors consider the plant in general well equipped to carry on a ship building business on a large scale.

"The yard has been well filled with work during the entire year, and the amount of business now in process is satisfactory. Considerable delays have been experienced in construction, through the difficulty in purchasing good steel castings. The average number of employes for the year was 3,900. The following vessels were under construction on December 31, 1906: Battleship Vermont, now ready for delivery; scout cruisers Birmingham and Salem; four submarine boats, of which two are practically ready for delivery; the 10,000-ton freight and passenger steamer Creole; two steel freight steamers Ocmulgee and Ossabaw, and three 11,000-ton steel colliers, Everett, Malden and Melrose.

"The company has undertaken the development and construction of a thoroughly equipped steamship terminal on a large scale for the use of the Atlanta, Birmingham & Atlantic Railroad Co., at Brunswick, and the work on this contract is well advanced and is progressing in a profitable and satisfactory way.

"During the year the battleships Rhode Island and New Jersey, the side wheel passenger steamer South Shore and two steel freight steamers Satilla and Ogeechee have been completed and delivered, in addition to a considerable amount of miscellaneous work. The machine shop has been operated at all times to the limit of its capacity.

"The development work of the year on the Curtis marine turbine has been on the whole very encouraging to the directors, and it is their belief that the exclusive option held by the company on marine rights of this turbine for this country will prove of great value in the future. The principal turbine contracts so far obtained by the company are for the construction of the U. S. scout cruiser of 3,750 tons, the Southern Pacific S. S. Creole of 10,000 tons, and for the construction of turbine equipments for two large vessels. The Creole will be completed in the near future, and if the trial of this vessel fulfills the expectations of the management there will undoubtedly be a demand for further vessels fitted with Curtis turbines, which should be of great benefit to the company.

"On the whole, the results of the year are believed to be encouraging and the outlook for new work is sat-

isfactory. A contract has just been entered into for the construction of a steel freight coasting steamer."

WHITE'S REVIEW OF SHIPPING.

John White, 23 Great St. Helier's, London, E. C., in his annual review of shipping, says:

"The effect of tonnage has been increased, it is estimated, by about 1,000,000 tons of dead weight carrying capacity by the reduced freeboard that has been sanctioned. The production of our shipyards of merchant steamers has been about 1,800,000 tons gross, which is the largest production of any year, and exceeds the large total of last year by about 200,000 tons. The tonnage added to the British Register, i. e., new steamers and steamers bought from foreigners, has been about 1,550,000 tons. One yard alone, Messrs. Swan, Hunter & Wigham Richardson, Limited, has produced 26 steamers of 126,921 tons. The steamers removed from the British Register, including those sold to foreigners, have been about 550,000 tons. The building of sailing ships is now so small that it can scarcely be called a factor in considering effective tonnage afloat, but there have been removed from the British Register, including Colonial Register, about 200,000 tons of sailing ships.

"The past year has witnessed the launching of the largest and fastest steamers on record, and probably the limit in size, if not in power, that the necessities of commerce or prudent enterprise will dictate for many years to come. The gigantic Cunard Co.'s turbine steamer Lusitania was launched by Messrs. John Brown & Co. in June, and the sister steamer Mauretania by Messrs. Swan, Hunter & Wigham Richardson in September last. They are each of about 33,000 tons gross register, 760 ft. b. p. by 88 ft. by 60 ft. 3 in. to upper deck, having six decks, displacement 45,000 tons, and power 72,000 i. h. p. to drive them 25 knots per hour at sea. These vessels are a considerable increase on the previous largest steamers afloat, British or foreign. On the same day as the launch of the Mauretania, there was launched by Messrs. Harland & Wolff, for the White Star line, the steamship Adriatic, of about 25,000 tons gross register, 708 ft. by 75 ft. by 50 ft., with engines to steam about 18 knots. The increase in size of vessels has extended to warships launched during the year, as seen in the turbine Dreadnaught, 18,000 tons displacement, 520 ft. by 82 ft. by 45 ft.; Lord Nelson, 16,500 tons displacement, 410 ft. by 79 ft. 6 in. by 43 ft.; and Agamemnon, of about the same size. There were under construction at the end of September, according to the returns of Lloyd's Register of Shipping, of

merchant steamers 1,253,031 tons—about 100,000 tons less than at the end of last year.

"The past year opened with ship builders and engineers well supplied with work, and many sufficient to occupy them the greater part of the year new orders however, became scarce, and early in the year many builders found themselves getting through their contracts and with little inquiry. Owners realizing the large amount of tonnage building increased by the additional tonnage afloat produced by the reduced freeboard, dissipated the anticipated improvement in freights. In the spring freights in most directions had substantially declined, withheld further orders, notwithstanding builders, although material kept high, were prepared to reduce prices. As contracts continued scarce, many builders paid off some of their men in September. It was strange that at this time the Clyde shipbuilding men should have been so imprudently advised by their leaders to strike, causing the masters to pay off other classes of workmen, which of necessity resulted after two months' idleness in the defeat of the men. This suspension of work has assisted in the yards being better employed at the end of the year than they would otherwise have been. The increase of trade shown by the Board of Trade Returns and movement of produce abroad, with the continued advance in the cost of material, has encouraged the placing by owners of numerous orders during the past two months, and prices, therefore, are about 5 per cent higher than would have been accepted in the autumn. The contracts of the year, apart from ordinary cargo steamers, include twenty steamers for the Lloyd Brasileiro trading from the Brazils up the American coast, six large steamers for the new mail service between Great Britain and Australia under contract with the Commonwealth government, and many steamers for foreign lines. All foreign countries except America and China have increased the fleets of existing companies, some of which have enlarged their capital and many new owneries, and where the countries have building facilities they have extended their building, and in several cases been close competitors with our builders.

"Steel ship plates in January were £7 10s per ton, and gradually eased down to £7 in July, when a further reduction was contemplated; but the demand from the United States for pig iron in August stiffened prices, which are now up to £7 10s to £7 15s. There is no doubt that the price of material has been forced up by the foreign demand for steel, although there is a strong feeling that makers have put prices up unduly by combination, which they can do, not having at present

any competition of foreign makers.

"The Australian trade from Great Britain has provided surprises in the Royal Mail Steam Packet Co. taking the place of the Pacific Steam Navigation Co. in that trade, when the anomaly occurred of the shares of the former company going up in consequence of their having got in, and the shares of the latter company going up in consequence of their having got out of, that trade. The new mail contract, to commence in 1908, of the Commonwealth has been awarded to an entirely new company.

"The prices of steamers to build are higher than a year since, in consequence of the advance of shipbuilding material and increased cost of machinery. With only two or three exceptions of forced sales, prices of new steamers for sale have been fairly well maintained throughout the year. Second-hand steamers have been in good demand; the principal foreign buyers have been Scandinavian, German and Greek. Prices for moderately modern tonnage have continued very near what they were a year ago.

"The combination of important English ship builders with foreign firms has been extended by the connection of Palmers Shipbuilding Co., Limited, with La Societa Cantiera, of Genoa, making with Messrs. Armstrong, Whitworth & Co.'s association with Messrs. Ansaldo & Co., of Genoa, and Messrs. Hawthorn, Leslie & Co. with Messrs. Hawthorn, Guppy & Co., of Naples, three Tyne firms engaged in ship building in Italy, which is becoming a very important building country.

"As already stated, foreign ship owning has extended. France passed a new bounty bill in April last, varying from their previous subsidies which were evidently intended to encourage ship building as much as ship owning, by extending the bounty to foreign-built ships not over two years old. This has not encouraged so far any large number of orders to our builders, partly, probably, on account of present prices not being sufficiently attractive. Our American friends still continue to agitate the subject of subsidy with much divided opinion to create a mercantile marine, but they will doubtless wisely continue to devote their energies to internal trade in which they are so successful, and defer undertaking what they cannot produce nor work as economically as their friendly competitors who provide them with cheap transit for their produce."

The city council of Philadelphia after having failed to induce congress to authorize a survey of the Delaware river, has appropriated \$10,000 for this purpose. A 35-ft. channel is desired and the not infrequent groundings indicate the need of it.

ABOUT JAPANESE SHIPPING PROSPECTS.

The report of the Nippon Yusen Kaisha for the second half of its business year has recently been made public. The business is shown to be in a most flourishing condition and promises to Japanese shipping a very prosperous future. The report in part is as follows:

"The net profits for the six months were \$622,000, to which was added a surplus of \$491,700 from the preceding period. Of this sum \$31,000 was placed to the reserve, \$35,600 paid in bonuses to officials, \$550,000 used for a 10 per cent per annum dividend and \$110,000 for a special two per cent dividend (thus maintaining the usual 12 per cent dividend), leaving a surplus of \$387,100.

"The company has placed orders with Japanese ship building yards for the construction of six steamers, each of 8,600 tons, and they are expected to be completed in the course of 1908. For the payment of the cost of these steamers no loan will be raised, but the cost is to be drawn on a surplus so far accumulated and also on the reserve to be set aside for the depreciation of the value of steamers."

BRITISH MERCHANT MARINE INCREASES.

In view of the efforts that are being made to get a ship subsidy bill through congress for the purpose of encouraging the American merchant marine, a report of the shipping of the United Kingdom for 1906, published by the bureau of manufactures, is of considerable interest. According to this report last year was notable for the largest addition to the British mercantile marine in effective tonnage and in size and power ever recorded in any one year. The total addition to the register was 1,550,000 tons. The merchant steamships turned out of the shipyards represent 1,800,000 tons of gross, an advance of 12½ per cent over the production of 1905. Sailing ships are no longer a factor of importance in considering tonnage afloat, and a further 200,000 tons was removed from the British register during the year.

The election of officers of the Monongahela River Consolidated Coal Co. on Feb. 1 resulted in the re-election of the following: President, Francis L. Robbins; vice president, George W. Theiss; secretary and assistant treasurer, James W. Barber; treasurer, W. Hamilton Brunt; assistant secretary, C. H. Van Dyke.

DECISIONS WHICH AFFECT SHIPPING INTERESTS.

There have been many cases in the admiralty courts growing out of collisions rules and speed of steamers in a fog. The following statements, taken from cases decided in the federal courts, will be of interest.

No fixed and inflexible rule can be laid down as determining what is moderate speed for steamers in a fog. This must depend upon the circumstances of each particular case; but 16 or 17 miles an hour in a dense fog is excessive for a large steamer in the direct track of the coasting trade.

While no rule can, perhaps, be stated as to what is moderate speed for a steamer in a fog in any particular case, it may at least be said that the speed ought not to be so great that she cannot perform the duty of keeping out of the way of a sailing vessel after the latter is discovered.

A steamship failing to reduce her speed, when going through a fog in one of the main lines of ocean travel to such a rate as will admit of her being brought to a standstill within the distance at which, in the condition of the fog, she can discover another vessel, is guilty of a fault rendering her responsible for a collision which might have been avoided had her speed been less.

Moderate speed in the meaning of the sailing rules is a speed which will enable the steamer, under ordinary circumstances, when approaching another ship, so as to involve risk of collision, effectually to slacken her speed, or, if necessary, stop and reverse.

If, after a fog horn is heard on a steamer, there is not time for her to slow and deliberate sufficiently to learn the position and course of the sailing vessel, and take proper measures to avoid her, that fact itself shows that the steamer is moving at too great a speed.

The moderate speed required of steamers in a fog by rule 21 is something materially less than ordinary full speed. It has reference to all the circumstances affecting her ability to keep out of the way, including her own power in backing, and requires a reduction of speed according to the density of the fog. Whenever the fog is sufficient to increase materially the dangers of navigation, a given speed may be moderate for a swift vessel, which would be excessive for a slow moving one having less power to stop and back quickly.

Full speed by a steamer in a fog requires, to excuse it, the existence of a present danger, and a necessity of going full speed to avoid it. A belief on the part of the master that a danger may, in a certain event, arise in the future, to

avoid which he gives the full speed order, is not a sufficient excuse under article 23.

A lake steamer, proceeding in the usual course of vessels during a dense fog, should stop occasionally to listen for sounds of approaching vessels, or, at all events, to run only at such speed as will enable her to stop as soon as the close proximity of another vessel is known.

SALVAGE SERVICE.—The United States District Court for the Southern District of New York holds that the raising of a scow under a contract, sunk in its home port, and where the work involved no element of danger and nothing out of the usual, is not a salvage service, which creates a lien on the vessel.

PROVISION FOR PROMPT LOADING.—Under a charter party for a vessel to carry a cargo of coal, which provided that she should "have turn in loading" and "be loaded promptly," she is entitled to be loaded promptly in view of the facilities of the port and the climatic conditions which existed at the time, and to have such facilities used to their normal capacity, not only in her own loading, but also in the loading of other vessels after her arrival while she was waiting her turn.

LOSS OF JEWELRY BY PASSENGER.—Section 4281 U. S. Revised Statutes provides that if any shipper of jewelry, etc., contained in any parcel or package or trunk shall take the same as freight or baggage, on any vessel without giving written notice of its character and value, and having the same entered on the bill of lading, the ship owner shall not be liable as carrier. The United States Circuit Court of Appeals for the Second Circuit holds that the section is intended to apply where such goods are received from a shipper by a carrier for transportation in the usual course of business, and does not relieve a ship owner from liability for jewelry worn and carried on board by a woman passenger with the intention of placing it in the custody of the purser, as permitted by the rules of the ship, but which was stolen by an employee of the ship before she had the opportunity to do so. The case also holds that a ship owner is liable to a passenger for the value of jewelry stolen during the voyage by a steward employed to perform duties which the carrier owed to the passenger under the contract of carriage; also that conditions printed inconspicuously upon a steamship ticket, providing that the ship owner shall not be liable for any loss of the passenger's baggage through theft, or any act, neglect, or default of the ship owners, servants or others, which are not known to the passenger nor called to his attention, are invalid and constitute no defense to an action by the passenger to recover for the loss

of jewelry stolen by one of the ship's employees.

RIGHTS AND LIABILITIES OF PART OWNERS OF VESSELS.—Where a vessel is held by two conflicting interests, each equal in amount, and both equally desirous of employing it, an obvious difficulty arises. The principle that as between co-owners those desiring to employ the vessel shall prevail over those opposed to its employment, whether their interests be equal or unequal, and the principle that where both desire to employ, the interests being unequal the majority shall control, are both inapplicable. Actual partition of the common property is rendered impracticable by its nature, and the most obvious remedy is its sale and distribution of the proceeds.

The tendency of the American cases is to confine the power of sale to cases where the warring interests are equal, both desirous of employing the vessel.

With but few qualifications the rights and liabilities of part owners of vessels are the same as those incident to a tenancy in common of other chattels. One part owner is not liable to a co-owner for failure to employ the vessel, nor for profits which might have been earned had it been employed. Where a vessel is lost in the usual trade and without any negligence or wilful misconduct on the part of the owner in charge, the loss falls on all the owners, and the owner in charge is not liable to the others for their respective shares. Where, however, the loss of the vessel is traceable to the fault of a co-owner, each part owner has a right of action in tort against him to the value of such owner's share.

Part owners of a vessel cannot, by excluding their co-owners from the possession of the vessel, although the latter hold a minority of the shares, deprive them of their proportion of the vessel's earnings. The excluded part owners may, and, where they do not dissent from the voyage are presumed to stand upon their legal rights, and claim the benefit of the voyages made. Since, however, a right to share in the earnings carries with it the obligation to contribute to the losses, a part owner may undoubtedly dissent from a proposed adventure, and by making his dissent effective may absolve himself from all connection with it. In such a case the adventure is at the risk of and for the benefit of the other co-owners. What, then, is necessary to make his dissent effective? Where the dissenting part owner, by application to a court of admiralty, requires of his co-owners a stipulation for the safe return of the vessel, not only does he deprive himself of any participation in the earnings and repel any idea to contribute to the losses of the voyage, but if the vessel itself be lost, he is entitled to reimbursement for his share.

As respects the right of one part owner to dispose of the interest of a co-owner in the vessel, part owners of vessels are on the same footing as other tenants in common of chattels. Part ownership in itself confers no such power of disposal of a co-owner's interest on the holder of a share in a vessel, and neither by sale nor mortgage can the holder of any number of shares, whether a majority or minority, affect the title of a co-part owner to his share in the vessel. Where a partnership exists between the part owners, and the ship is held as partnership property, the rules of partnership, rather than that of part ownership, apply. Where this is the case, any of the partners may sell or mortgage the entire vessel. Where the relation between the part owners is one of part ownership merely, and the vessel is in no sense a partnership asset, no lien exists in favor of one part owner on the ship, or on the share of a co-owner for a balance due on the part ownership account.

Where one renders services or supplies materials to a vessel, the mere fact that he is also a part owner does not, as against his co-owners deprive him of any lien which he would otherwise have against the vessel. Where, however, the right to a lien arises not as between co-owners, one of whom rendered the services, or furnished the supplies, but between such part owner and a creditor of all the co-owners, the question is a different one. To hold in such case the lien of the part owner would take priority over the claims of creditors would be to hold that one might have a lien on his own property and assert it against a debt for which he was individually liable.

(To be continued)

THE RIGHTS OF SEAMEN AS SALVORS.

Under ordinary circumstances, seamen may not become general salvors of their own vessel. This rule obviously arises out of the great desirability of avoiding any tendency to separate the seamen's interest from that of his ship, and is based upon the theory that, by his contract of service, he engages for the wages stipulated, to render any services necessary in the ship's behalf.

A literal compliance with this rule, however, under all circumstances, is not deemed desirable by the courts, whose policy is to encourage attempts for the preservation of life or property upon the water, and therefore a number of exceptions have grown up upon the theory that seamen may receive salvage for acts not within their contract of service, or performed after its dissolution.

In conceding that there may be cases in which seamen may become salvors of their own vessel, it may be so only in

very extraordinary cases, where the services rendered are without the range of their contract, and therefore voluntary.

The difficulty arises in determining where the line of the seaman's duty under his contract ends; and there is considerable authority for the doctrine that whatever is necessary to be done for the ship's safety, within the power of the seaman, is within his duty under his contract, and that for such acts, however gallant, he has no claim for general salvage. In a case before the Federal Courts, seamen were allowed salvage for services performed for the benefit of their ship under the following circumstances.

The vessel becoming so surrounded by ice as to endanger its safety, the master and crew, with the exception of two seamen, went on shore. These seamen, later in the day, succeeded in averting a collision with another ship, rendered imminent by the drifting of the latter toward their boat upon the breaking up of the ice. Afterward they, too, went on shore and spent the night, but in the morning, seeing that the vessel was still intact, they again went on board at the request of the master, who was injured, and remained in the care of the ship for several days until the return of the master and crew. It was held that the services performed by the seamen came within the exception to the general rule that a crew cannot entitle themselves to salvage against their own vessel.

There is no doubt that an abandonment, by the master, of the crew and ship, operates to discharge the seamen's contracts of service, so that for services thereafter rendered in saving the ship and cargo they may claim salvage as volunteers. Seamen, who were attached to a ship at the time of its wreck and abandonment, and were thereafter appointed by the master to guard the property during a severe winter on an uninhabitable northern coast, were held entitled to salvage for their services in that regard, on the ground that their connection with the ship in the capacity of seamen was dissolved upon its abandonment by the master and crew. In another case it was held that part of a crew, who remained on board after abandonment by the master and the rest of the crew, and under such circumstances that the abandonment was justifiable, were entitled to salvage compensation if they performed valuable services, and that while a contract of a sailor excludes salvage compensation, it may be allowed in extreme cases.

Considerable difficulty is encountered by the courts in determining whether the facts before them constitute an abandonment. Where the master and crew, with the exception of the mate and two men, abandoned the ship when it struck upon

rocks, without hope that it could by any possibility be saved, and the master urged those remaining to come with him, but they refused, being determined to stay by the ship and "see the last of her," it was held that the facts showed a discharge by the master of all claim under the seamen's contracts for their further services, and therefore that they might claim salvage for great exertions and gallantry subsequently displayed, whereby they succeeded in getting the vessel into port. The court said: "Where the master and the rest of the crew have quitted the ship, renouncing all hope of saving her, and some have remained in spite of his expostulations, and almost his commands, to confront dangers which he declined to encounter, and by so doing have saved the ship, justice, as well as the true interests of owners and insurers, demand that the courts should recognize as a legal right the seaman's claim to a liberal compensation for his supererogatory services."

In another case a seaman's contract of service was held dissolved, so that he might be entitled to salvage, where after a collision, the master and all the crew, with the exception of himself, got on board the colliding vessel, which refused to delay longer in order to save him, whereupon he used his utmost exertions for the preservation of the vessel until he finally received help from the shore.

(To be continued)

FORE RIVER'S RECORD.

The battleship Vermont was delivered to the government on Monday, Feb. 11, at the navy yard, Boston, by the contractors, the Fore River Ship Building Co. This makes what might be termed a record, for three first-class battleships have been delivered from the ship yard at Quincy within one year, the New Jersey, Rhode Island and Vermont. The Vermont was built in contract time, only one extension of time of forty-six days was granted on account of the strike in 1904, at which time no work whatsoever was preformed on the vessel.

A bill has been introduced at Washington for the holding of an exposition to be known as the Universal Peace and Commerce Exposition at Los Angeles, Cal., in 1915, at which time it is contemplated the Panama canal is to be opened. The exhibits would include the arts, industries, manufactures, and products of the soil, mine and sea.

The steel turbine steamer Camden, building for the Eastern Steamship Co., was launched recently at Bath, Me.

PUBLIC POLICY DEMANDS A WATERWAY SYSTEM.

At a meeting of the Western Society of Engineers recently a very exhaustive and interesting discussion of the national waterways system took place. The participants included Mr. Lyman E. Cooley, dean of the engineering department of the University of Michigan, Mr. Charles T. Harvey, the Hon. Joseph E. Ransdell, of the rivers and harbors committee of the house of representatives, and others. Mr. Cooley's discussion was particularly interesting as he went deeply into the possibilities of our existing waterways and the feasibility of a national waterways development, and which for breadth of conception has probably never been surpassed. He says in part as follows:

"In 1899 I undertook an investigation of the freight producing resources of the United States and of British North America, with special reference to the great lakes considered as an arm of the sea, and of the conditions under which commerce would seek lake ports.

"At that time I discovered that the existing commerce of the great lakes was 29½ per cent measured in ton miles, of all the railways of the United States: that the domestic commerce of the United States carried by water was about 87 per cent (in ton miles) of that carried by all the railroads; that the over-sea tonnage, measured in ton miles, of commodities in the foreign trade was about 123 per cent of that of all the railroads of the United States, and that the aggregate service of water to the United States as a means of transportation was about 2.1 times of that by rail. That is sufficient reason to justify consideration of these matters.

"Take the United States as a geographical and topographical unit; we have some 3,000,000 square miles of territory which may be divided into four characteristic regions. The portion east of the Allegheny mountains and east of Niagara Falls, if you please, extending from Maine to Florida, may be called the Atlantic maritime territory, having an area of about 375,000 square miles, or about 12½ per cent of the total area, and an extreme length of 1,800 miles, and a width varying from 100 to 350 miles. Going westward, the Mississippi valley lies between the Allegheny and the Rocky mountains, and includes the upper lakes system above Niagara, the valley of the Red river of the North to the international boundary, the Alabama river system as far east as Georgia, and the rivers of Texas. The upper

lakes belong geographically and topographically to the Mississippi valley, and it is supposed to be a geological accident that they ever spilled over Niagara and down the St. Lawrence. Prof. Gilbert, of the United States geological survey, holds that there is a tilting in the crust of the earth, by which the outlet will be restored to Chicago in about 2,500 years. But Chicago has been forehanded in digging her canal in order to keep from being drowned out, and will no doubt be able to make sufficient enlargement to meet the conditions predicted by Prof. Gilbert as they shall develop.

"The Mississippi valley as thus outlined comprises 1,725,000 square miles of territory, or 57½ per cent of that of the total area; about 1,600 miles long from north to south and about 1,700 miles in extreme breadth; the greatest valley with the most uniform topography, and the greatest single area that was ever spread out in one plain without barriers, for the occupation of man. You have comprehended in the Mississippi valley and the Atlantic slope about 70 per cent of the total area of the United States.

"The Pacific maritime territory embraces about 5 per cent of the total area, or some 150,000 square miles, a mere margin on the Pacific and a portion of the lower Columbia river basin. Between the Pacific territory and the Rocky mountains is the great basin territory embracing an area of 750,000 square miles, or about 25 per cent of the total, a country with little water and sparse drainage; a little in the north by the head waters of the Columbia river, a little in the southwest by the Colorado, and a little in the southeast by the Rio Grande; very elevated, and very sparse in resources.

"Again, the United States may be divided into two equal parts, by a north and south line lying generally between the 97th and 100th meridian. This may be called the arid line, and divides the country on the east, which may be cultivated by dry tillage, from that on the west, which requires irrigation. This line leaves the Gulf of Mexico about longitude 97°, and crosses our northern boundary about 102° longitude. The average may be taken as 99½° longitude, west from Greenwich. The state of Kansas by statute has fixed the arid line at longitude 99°, west of which the waters are appropriated for irrigation, and east of which the ordinary riparian law of humid country obtains.

"The half of the United States west of the arid line contains only 200,000 square miles with sufficient water to

raise a crop without irrigation. The arid territory comprises 1,300,000 square miles, and is very poor in water resources.

"My object in calling attention to the character of this region is to emphasize the fact that the waterway district of the United States lies largely to the east of the arid line, and the territory to the west, which is susceptible of waterway development, is limited to the humid section of 200,000 square miles and to perhaps 300,000 square miles more in the basins of the upper Columbia and upper Missouri, which fortunately break well across the continent; and further, that a large percentage of the resources of this so-called arid region is tributary to these two great river systems.

"To the east of the arid line is the humid territory of the Mississippi valley, an area averaging 1,000 miles in width and 1,100 miles in length from north to south, or a total of 1,125,000 square miles.

"The western border, at the arid line lies generally close to the 2,000-ft. contour of elevation. The eastern border soon descends from the mountain region to elevations of 1,000 ft. or less in the head waters of the river systems. The thalweg, or lowest line, extends centrally from south to north, reaching a summit of less than 1,000 ft. in the Red-Minnesota valley at Lake Stone and Traverse, descending thence northward to 720 ft. at Lake Winnipeg and to sea level in Hudson Bay.

"To the northeast is the branch thalweg with its summit at Chicago, with a height of less than 600 ft., or an altitude below the top of the Washington monument in the District of Columbia, and this altitude measures the height within 20 or 30 ft. of the lake plateau extending easterly to Niagara; thence the descent is to the northeast and to the Gulf of St. Lawrence.

"We have, therefore, two very remarkable locations for waterways of the first class; one by the Mississippi and the Red-Minnesota divide northward, to the river and lakes system of British North America and to arctic sea level; the other by the Chicago divide and the great lakes northeastward to the Gulf of St. Lawrence, in the direction of Europe.

"On this north and south base line we have a strip of territory 500 miles wide and sloping up to the 2,000-ft. contour on the west, and some 1,400 miles long, threaded with rivers capable of commercial development. On the east we have another 500-mile strip, well watered and filled with numerous

streams, capable of development.

"Within this territory some 15,000 miles of rivers have been actually navigated and considered worthy of improvement by congress. There are some 7,500 miles of trunk streams, like the Mississippi to St. Paul, Ohio to Pittsburg, Cumberland to Nashville, Tennessee to Chattanooga, the Missouri, the Arkansas, and the Red; and some 7,500 miles of tributaries. Judging by the tributary streams which are listed in the state of Illinois, the mileage can be readily multiplied by three.

"Passing eastward to the Atlantic maritime territory, the conditions are very different. This region is subdivided into four divisions or compartments. To the north is New England with 66,000 square miles distinct and apart. Next is the New York Bay province of 84,000 square miles, embracing New York, New Jersey, and Pennsylvania, which constitutes the natural link for transportation between the west and the north Atlantic seaboard. Through this, by way of the state of New York, must pass a great future ship canal from the Mississippi valley and the great lakes to the north Atlantic coast.

"Next is the Chesapeake Bay system of some 100,000 square miles, embracing Maryland, Virginia, and North Carolina—a distinct entity, and almost isolated in its waterway possibilities, from connection with the west. To the south is the south Atlantic compartment and some 125,000 square miles, embracing South Carolina, Georgia and Florida, and through these a link to the seaboard will some time be opened from the Tennessee river by way of Atlanta and northern Georgia.

"Through a remarkable development of bays and sounds it is possible to connect the lower reaches of the river systems and thus produce a connected development for a portion of this area, but the rivers generally soon reach a high altitude as they approach the mountains, and the Atlantic maritime territory is not susceptible of any proportional development to that of the Mississippi valley.

"I wish now to call your attention to some matters in connection with railroad transportation, yet very briefly.

"In the last ten years transportation on the railroads in the United States, in ton miles, has increased about 117 per cent, or has more than doubled. The actual increase in mileage has been about 20 per cent. The density of traffic, that is the tons carried over each mile, has increased about 50 per cent and perhaps 50 per cent of the

increase is due to new mileage. The number of tons transported, however, has increased less than 50 per cent; it was June 30, 1904, about 611,000,000 tons, as against about 416,000,000 tons ten years before; that is for the total freight originating on all the railroads considered as one system.

"The rates have not changed very much in the last ten years. They have run along at about 0.78 of a cent per ton mile, considering the railroad systems as a whole.

"Of the commodities carried by rail, 52 per cent is the product of mines, 40 per cent of which being coal and the remainder ores, building materials and like products.

"The effect of a waterway system will be to largely relieve the railways of those coarse freights of low value, the cost of which will be reduced to the consumer by probably one-half. This leaves to the railways the more profitable, high-class freight, and the express, mail and passenger business. If we were to devote \$100,000,000 a year to the construction of a waterway system we may well believe that no injury would result to the railway system, as the growth of commerce in recent years has been far greater than the facilities which could be provided.

"James J. Hill, in his speech before the Commercial Association very recently, took the pains to observe that the growth of traffic in this country was so enormous that it would be impossible in the next ten years for the trunk lines going east to carry it without building new lines and increasing their terminal facilities enormously; and I think we can look to a time when it will be impossible for the railroads, on account of the cost of the increased facilities which they must provide to lower their rates. In other words, they come to a point, as in the telephone system, where the cost of doing the business increases with the number of subscribers, and I think railway rates, especially in the forwarding business, will ultimately reach such condition that no radical reduction can be looked for.

"If all the railway capital were to be eliminated today, we would not be able to reduce rates below the cost of operation and maintenance, and which amounts to 66 per cent of the total receipts. If we take the cost of reproducing the railway system at one-half the present capital account, it would not be feasible to reduce the average rate by more than one-sixth. Such results are all that it is possible to effect by any legislation based on proper capitalization and a reason-

able return, or on public ownership. So we must regard a waterway system as an absolute need of the future, with its growth of population and densification of traffic, and the development of resources in the coarser products."

INTERNATIONAL FERRIES.

It would seem that international steam ferries are destined to play an important part in the intercourse between certain nations, and that they materially tend to facilitate and increase the traffic. The most striking example of this respect is probably the Danish-German steam ferry connection, Gedser-Warnemunde, across the Baltic, in which four large steam ferry boats, two Danish and two German, are engaged. The Imperial German postal department in a recent report points to the vast importance of this ferry traffic as far as the three Scandinavian countries and Germany are concerned, and, indeed, the whole continent. The mail carriages go now direct from Berlin to Copenhagen, and the officials can consequently work uninterruptedly the whole way. The sleeping cars are very well patronized, and passengers can now go to bed in Copenhagen and awake in Berlin, and vice versa, just as is the case with the Hamburg - Copenhagen traffic, where the sleeping cars are taken across the two belts on steam ferries, as a rule, without in the least disturbing the passengers. The ferry connection is, however, of still greater importance for the goods traffic. On one day early in December last 126,000 fresh fish were despatched to Germany from Norway and Sweden in through cars, via Gedser-Warnemunde. A steam ferry connection across the channel would open out immense possibilities for increased traffic between England and the continent. In Sweden a special committee has been appointed to investigate and report on the proposed Swedish-German steam ferry connection (by way of Trelleborg-Sossnitz, on the Island of Rugen, or Trelleborg-Barhoft, on the continent, some 10 miles north of Stralsund), and a committee has also been formed in Berlin. The expenditure will be considerable, and Germany does not seem altogether disposed to undertake the necessary disbursements; still the town of Stralsund is much interested in the latter route, which would necessitate the building of a railway from Barhoft to the town. This route will also be cheaper, and will probably be some 1½ hours shorter.



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THE SHIPPING BILL.

It is gratifying to report that there is reasonable hope for the passage of the shipping bill during the present session of congress. The splendid measure drawn by Senator Gallinger and which was passed by the senate, will not be passed by the house, but in its place will be substituted a measure which, while not giving all that is desired, will open the way to prove the case of American shipping before the world. The Littauer bill provides for the establishment of a number of ocean mail lines to be carried on by steamers of designated speeds. It so happens that there are no vessels in commission that meet the requirements of the contemplated service. They will have to be built, thus stimulating the ship yards and collateral industries in a hundred different directions. The pres-

ent plan is to bring the issue to a vote on Friday afternoon of the present week at 3 o'clock. It has all along been known that if the measure could actually be brought to the test of a vote in the house that it would be passed. Such now, indeed, appears to be the case. Friday, therefore, it is hoped will be a red letter day in the history of the American merchant marine.

For over fifty years the assistance of the general government has been withdrawn from shipping on the high seas, with the result that the American flag has well nigh disappeared from the oceans of the world. The decline of the American merchant marine has been swift, because in conjunction with the withdrawal of governmental support, a general policy of protection to all other industries has been adopted. This has put a double handicap upon the American ship, because it has been burdened with high cost of construction and high cost of operation. It is unfortunate that this question, which should be a national one, is made a party question. However, it is gratifying to realize that there are sufficient republican votes to pass the measure. When ocean lines are once established, when trade is flowing, when American branch houses are established in foreign parts, when regularity in sailing dates can be observed, the American ship will not need protection. Until that time comes, however, it should be protected, and therefore congress will do wise to pass the Littauer bill.

DREDGE OWNERS' TROUBLES.

The dredge owners on the great lakes have their troubles. More than ordinary vicissitude attends their business. In the first place, though dredging is as legitimate and exclusively a private enterprise as a dry goods store or a grocery shop is, the government enters into it as a competitor. Government dredges have found their way to the great lakes and have entered directly into competition with private concerns that have expended thousands upon thousands upon equipping plants. Comparisons per cubic yard of material dredged between private dredges and government dredges are unfair, because the government allows nothing for maintenance or depreciation. Latterly another element has en-

tered into the situation and that is the eight-hour day. The workmen desire an eight-hour day because the government regulations call for a day of that length; but only a portion of the work that private dredges do is for the government. The dredge owners have declined to sign upon an eight-hour basis. Three years ago a similar attempt was made to compel shipyards engaged on government work to conform to the eight-hour day, but it was represented to congress by the ship builders that this meant ruin to them. Ship builders believed that as long as the men wanted to labor ten hours for ten hours' wages, they should be permitted to do so. The dredge owners will be quite as emphatic in their stand as the ship builders were.

IMPORTANT WEEK FOR THE LAKES.

The past week has been an important one to lake interests. By the passage of the Frye amendment in the river and harbor bill, work upon the third lock at the Sault can proceed regardless of litigation pending between private interests seeking to use the power of the rapids. All permits heretofore granted by the secretary of war or any other authority to erect any power plant or any structure in the rapids, are revoked. The government will acquire immediately sufficient land upon which to build the third lock and has made clear its intention to eventually take over all the lands up to the international boundary line under condemnation proceedings. Work, therefore, at Sault Ste. Marie, which has halted for over a year owing to private squabbles, will now go on.

The city of Chicago has been told that it cannot use the waters of Lake Michigan to reverse the flow of the Calumet river. Gen. Alexander Mackenzie, chief of engineers, has declined to issue a permit for this purpose on the ground that it would seriously interfere with lake levels. Chicago must attack its sanitary problem in some other way. The argument in rebuttal put forth by Chicago that lake levels have been lowered by improvements at the Sault is not substantiated by the engineers. As long as the level at the head of the rapids has not been lowered, the outflow from Lake

Superior has naturally not been accelerated.

The first step has also been taken to control the navigation of the restricted channels in the rivers. Doubtless within a very short time patrol boats in charge of the war department will direct absolutely the movement of vessels in the congested waters of the Detroit, St. Clair and St. Marys rivers.

MITCHELL MASTERS AND ENGINEERS.

Capt. John Mitchell this week announced the appointments of masters and engineers of the different lines of which he is manager. Capt. Mitchell will operate twenty steamers next season. Eighteen of them are modern steel ships. The appointments follow:

Hugh Kennedy—Captain, C. B. Galton; engineer, William Fritz.

J. S. Morrow—Captain, William Ferguson; engineer, Peter Lavelly.

Loftus Cuddy—Captain, H. A. Stewart; engineer, J. D. Riley.

Joseph Sellwood—Captain, R. C. Jackson; engineer, Charles J. Love.

Pendennis White—Captain, Fred Furtaw; engineer, Frank B. Parker.

S. M. Clement—Captain, H. H. Townsend; engineer, William F. Sauer.

Moses Taylor—Captain, F. D. Galton; engineer, Frank J. Hiller.

F. H. Goodyear—Captain, F. R. Hemenger; engineer, I. L. Francombe.

James Gayley—Captain, M. M. Stewart; engineer, John Maedel.

W. H. Gratwick—Captain, John D. Baird; engineer, William Zuehlke.

Walter Scranton—Captain, R. Z. Utley; engineer, Harry Graves.

J. J. Albright—Captain, J. W. Auterson; engineer, Otto Guy.

William E. Reis—Captain, William J. Tomlin; engineer, Louis Minnie.

E. A. S. Clarke—Captain, James B. Lowe; engineer, John Wellhausen.

M. A. Hanna—Captain, Richard O'Connor; engineer, John Ward.

H. S. Holden—Captain, Gus E. Anderson; engineer, John Scott.

J. J. McWilliams—Captain, Martin Walle; engineer, Gus Gey.

Lagonda—Captain, Edward Johnston; engineer, William L. Leng.

Major—Captain, Walter Rouvel; engineer, John Hughes.

R. L. Fryer—Captain, G. J. Bennett; engineer, John Gibson.

WANTED—Several new or second-hand Scotch boilers about 6 ft. diameter, good for 100 lbs. J. D. McRae, Oswego, N. Y.

CANADIAN LAKE & OCEAN NAVIGATION CO.

Following are the appointments for the Canadian Lake & Ocean Navigation Co.:

Steamer Turret Court—Peter McIntyre, master; C. J. McSorley, chief engineer.

Steamer Turret Chief—Malcolm McPhee, master; A. E. Kennedy, chief engineer.

Steamer Turret Cape—R. R. Simpson, master; R. R. Foote, chief engineer.

Steamer A. E. Ames—E. L. Stephen, master; S. Gillspie, chief engineer.

Steamer J. H. Plummer—J. Black, master; R. Chalmers, chief engineer.

Steamer H. M. Pellatt—W. H. Anderson, master; Wm. Byers, chief engineer.

Steamer Scottish Hero—Archie McIntyre, master; W. H. Durham, chief engineer.

SELLING OUT OF DISTRIBUTING COMPANIES.

The Pittsburg Coal Co. has sold its interest in the Milwaukee-Western Fuel Co. of Milwaukee to E. A. Uhrig, C. W. Moody and the Demmer estate. The Milwaukee-Western Fuel Co. was incorporated in 1901 with a capital stock of \$2,000,000, and was a consolidation of the B. Uhrig Fuel Co., H. N. Benjamin Coal Co., R. P. Elmore Coal Co., F. R. Buel Coal Co., and G. S. Eastman Coal Co. The following year the Pittsburg Coal Co. purchased a two-thirds interest in the concern. This interest has now been sold to Mr. Uhrig and his associates. The Milwaukee-Western Fuel Co. owns outright or through long-term leases eight of the largest coal docks in Milwaukee and handles about 1,500,000 tons of coal per annum. The Pittsburg Coal Co. has also sold out to the C. Reiss Coal Co., operating docks at Sheboygan and Escanaba.

IRON SITUATION.

Indications appearing in the iron and steel market during the past week forecast a heavy shipment of iron ore from the Lake Superior range next season. It is declared now that the season's tonnage will amount to 42,000,000 tons, about 2,000,000 tons more than had been estimated. The ability of the railroads in handling ore from the mines to the upper lake docks will be an important factor in determining whether this immense tonnage can be moved. There is some apprehension of a shortage of labor on the ranges next summer. The pig iron market continues to be the center of interest, and considering the large number of reports to the contrary now afloat, which ordinarily would tend to increase any inherent weakness, remarkable strength is shown. The ease with which

the sale of 50,000 tons of Bessemer and basic iron was made, when this tonnage was thrown on the market by reason of a large independent steel maker refusing to take it on a sliding scale contract, declaring the price excessive, showed proof of the strength of present conditions. There is a tendency of southern dealers to grant concessions in Chicago. Finished lines continue in great activity.

COAL CONTRACTS.

During the past week the Pittsburg Coal Co. and the Northwestern Fuel Co. made coal contracts for the season of 1907 on the basis of last year's freight rates, that is 30 cents to the head of the lakes, and 40 cents to Milwaukee. Other shippers have also chartered on the same basis and probably to date tonnage has been secured to move 5,000,000 tons of coal. Owing to the stiff advance in the railway tariff, fuel coal will probably cost steamers about 10 cents more than last year.

SCHOONER BLAMED.

The Joy Line Steamship Co. has filed a libel against the schooner Harry Knowlton charging her with the responsibility for the collision in which the Larchmont was sunk. With reference to the time of collision the libel reads:

Although the Larchmont sheered to starboard, the schooner came on, luffing to the northward, and struck the Larchmont at right angles on the port side. . . . Said collision and loss were not caused by or through any fault or negligence on the part of those in charge of the Larchmont, which was navigated with all precaution, but was lost by faults of the said schooner: In not having any competent navigator in charge; not having the proper lookout; no attendant at her wheel; not heeding the lights displayed by the Larchmont; that her own lights were not properly set, as required by law; crossing the path of the steamer's navigation without necessity; not keeping her course, but arbitrarily changing her course when it was known, or should have been known, that such change involved great risk of collision to both vessels. Also in not porting her helm, especially after the steamer's alarm whistles, and in other faults and neglects which will be shown on the trial hereof.

The filing of this libel will tend to take the case directly to the federal courts where the matter may be thrashed out by most rigid investigation.

J. J. Boland & Co., vessel owners and brokers, Prudential building, Buffalo, recently sent their customers a calendar illustrated with a photogravure in brown tones of one of Philip Boileau's heads. This particular product is entitled "Suzanne." Boileau seems latterly to have become more popular than Asti, though his types are altogether different.

Mr. A. A. Schantz has been elected general manager of the Detroit & Cleveland Navigation Co. to succeed the late W. C. McMillan. Mr. Philip H. McMillan will be the president of the company and Mr. George M. Black, secretary-treasurer.

CONTRACT WITH FISHERMEN.

Lake Erie fish dealers and representatives of the fishermen and tugmen's unions have reached an agreement after a conference lasting one week in Cleveland. The wage schedule adopted is slightly higher than that of last year. The captains, who received \$100 a month last year, will be paid \$110 per month at all ports except Erie, where they will receive \$115.50, as against \$105 for last year. Wages of tug firemen were advanced from \$75 to \$82.50 per month, with 50 cents an hour for overtime, as against 35 cents last year. The wages of the firemen were advanced about 15 per cent, the men to be paid \$2.75 up to Oct. 1 and \$3 per day during the balance of the season. The agreement includes all ports between Buffalo and Toledo, and was signed by President Keefe and Secretary Joyce on behalf of the International Longshoremen's Association.

OFFICERS FOR PASSENGER BOATS.

A. A. Schantz, general superintendent, announces the following appointments of officers for the steamers of the Detroit & Cleveland Navigation Co. and Detroit & Buffalo Steamship Co., for the season of 1907:

Steamer City of Detroit—Captain A. J. McKay; pilot, Malcolm McLachlan; chief engineer, William Huff.

Steamer City of Cleveland—Captain Archie McLachlan; pilot, John Lightbody; chief engineer, John Hall.

Steamer City of Alpena—Captain Mathew Lightbody; first officer, William McKenyon; chief engineer, Alfred Phillips.

Steamer City of Mackinac—Captain F. J. Simpson; first officer, Peter Schonisen; chief engineer, William McDonald.

Steamer City of the Straits—Captain, Salem O. Robinson; pilot, Peter Ferguson; chief engineer, William Stein.

Steamer Eastern States—Captain, Duncan McLachlan; pilot, Eugene Haywood; chief engineer, J. P. Wells.

Steamer Western States—Captain, F. G. Stewart; pilot, J. V. Brown; chief engineer, A. Carter.

When the new steamer City of Cleveland is in commission Capt. A. J. McKay and forward crew will take charge of her, and Capt. Archie McLachlan and his forward crew will be transferred to the steamer City of Detroit. Appointment of masters for the steamers City of St. Ignace (the old City of Cleveland) and State of Ohio will be announced later.

Chief Engineer J. P. Wells of the steamer Eastern States takes charge of the machinery in the new City of

Cleveland, and his present assistant M. E. Sickelsteel, will then become chief engineer of the Eastern States.

COL. LYDECKER TO RETIRE.

President Roosevelt has nominated Col. Garret J. Lydecker for the retired list with a rank of brigadier general. During the past two years Col. Lydecker has been at Detroit as division engineer, in addition to which he has been in charge of the Lake Survey. Col. Lydecker is a graduate of West Point, and has served with distinction for nearly forty years. His first assignment was at New Orleans in 1868. He then became assistant professor of engineering at West Point, then chief engineer at San Francisco, and later did lake duty at Milwaukee and Chicago. For several years following he was stationed at Washington, being assigned to Detroit in 1893 as successor of the late Gen. O. M. Poe. In 1902 he took command of the central division and fourteenth light-house district, with headquarters at Cincinnati, returning to Detroit in 1904.

EQUIPMENT ON SCHLITZ COAL DOCKS.

Ole Johnson, 932 Kenesaw St., Milwaukee, Wis., is installing electric coal unloading machinery on the Schlitz Brewing Co.'s dock at Milwaukee. There will be two electric traveling cranes arranged so as to widen according to the variation of the width of the dock. These cranes will be suspended over an area of 200 ft. by 600 ft. and will be able to unload the largest coal carriers on the lakes in fast time. Each crane will be of 10 tons capacity and will be equipped with Johnson's 2-ton automatic balance clam-shell buckets. The hoisting trolleys from which the buckets are suspended will have three electric motors each, allowing the traveling and hoisting at the same time, thereby causing the buckets to make the shortest routes possible. The cage for the operator is suspended from the trolley, giving the operator complete control of the bucket. The rigs will be equipped with automatic registering scales, which will weigh and record the weights of the coal as it is unloaded. Only one man is required to operate each rig, and owing to the balanced buckets the design is expected to be very economical in the use of electric power. The equipment will be ready by the opening of navigation.

DEEPENING KINGSTON HARBOR.

Kingston, Ont., Feb. 27.—The Canadian government is taking steps to clear Kingston harbor of a large shoal that exists down the center of the lower end. Engineer Fuller, of the

marine department, is here taking the necessary soundings. The government recognizes that Kingston harbor must be rendered perfect in every respect if the largest boats are to continue coming here. If vessels followed the ranges carefully, there would be no trouble, but many times they run on the shoal referred to. Delay is the chief result, as they seldom receive any damage. However, the harbor requires to be freed of the obstruction and the government is acting.

Kingston affords the best harbor on the great lakes for trans-shipment of grain and more grain is trans-shipped here in river barges to Montreal than from any other Canadian port. Last year the amount was 14,000,000 bushels. Kingston is on the chain of direct waterways to England, and also affords direct connection by rail with Halifax, the winter port of ocean shipment; hence Kingston is also suitable for winter storage.

The marine department has now instructed Engineer Fuller to take soundings in the lower end of Kingston harbor below Cataraque bridge, over a distance of a mile and a half, to see what dredging would be required to make a 26-ft. channel. The government has been asked to build a breakwater at the western end of the harbor to protect that section from the southwest gales.

NORTHERN NAVIGATION CO.

A point of interest in the annual report of the Northern Navigation Co. is that the company believes that two new steamers of the Huronic type should be added to its fleet to take care of an increase in business which is bound to come. The company has purchased the steamer Tadousac to replace the Monarch lost on Isle Royale last year. The Tadousac is now being fitted up as a package freighter. In August last the company added the iron package freight steamer Cuba, now the Ionic, to its fleet. The Ionic was on Dec. 7, blown ashore under White Fish Point, and is now at Sault Ste. Marie. She will be taken to Duluth for repairs at the opening of navigation.

The gross earnings of the company were \$606,950.20, and the expenditures \$471,876.63, leaving a net balance of \$135,073.57, which added to the balance at the end of 1905 makes a total of \$183,216.23. Maintenance, repairs and incidental expenses reduce this balance to \$135,827.41, upon which a dividend of 6 per cent and a bonus of 1 1/2 per cent was declared. Bonuses amounting to \$3,728.00 were also distributed among the officers and office staffs.

Officers and directors were elected for

the current year as follows: President, H. C. Hammond; vice president, W. J. Sheppard; secretary-treasurer, C. E. Stephens; other directors, J. S. Hendrie, F. A. Lett, W. D. Matthews, H. P. Smith and H. Y. Telfer.

ST. LAWRENCE & CHICAGO STEAM NAVIGATION CO.

At the annual meeting of the St. Lawrence & Chicago Steam Navigation Co., held in Toronto recently, the old board of directors was re-elected as follows: President, W. D. Matthews; secretary, J. H. G. Hagarty; superintendent, S. Cranage; C. H. Gzowski, E. B. Osler, G. F. Hagarty, Toronto; J. Carruthers, Montreal; G. R. Crowe, Winnipeg.

It was decided to issue \$187,000 of new stock, offered to present shareholders at par, for the purpose of completing payment on the new steamer now being constructed at the yard of the Canadian Ship Building Co. The following financial statement was submitted:

ASSETS.	
Four steamers, Rosedale, Algonquin, Iroquois, W. D. Matthews	\$560,000.00
New steamer (expended to date) ..	40,120.25
Due by underwriters	5,000.00
Balance in bank	74,176.35
	<hr/>
	\$679,296.60
LIABILITIES.	
Capital	\$563,300.00
Balance of profit carried forward ..	115,996.60
	<hr/>
	\$679,296.60
PROFIT AND LOSS.	
Balance forward, Jan 2, 1906	\$ 80,057.27
Steamships' earnings .. \$117,400.81	
Due by underwriters .. 5,000.00	
Interest	2,649.30
	<hr/>
	125,050.11
	<hr/>
	\$205,107.38
Insurance	\$19,941.00
Cost of management, viz.: directors' and auditors' fees, salaries, taxes, office rent, etc	12,839.78
	<hr/>
	\$ 32,780.78
Dividend, 10 per cent, payable Jan. 2, 1907	56,330.00
Balance carried forward	115,996.60
	<hr/>
	\$205,107.38

AROUND THE GREAT LAKES.

J. T. Waters, Port Huron, has been appointed agent of the White Star line with headquarters at Port Huron;

The schooner Sweetheart of the Olga Transportation Co.'s fleet has been sold to James O'Connor of Tonawanda.

The Great Lakes Dredge & Dock Co. has been awarded the contract for dredging on the Cuyahoga river at Cleveland.

A revision in colors of Chart No. 1, St. Lawrence River, has just been issued by the United States Lake Survey and is for sale by the MARINE REVIEW.

The Arnold Transit Co., Mackinac Island, has purchased the passenger steamer Columbia from Charles A. Webb of Traverse City.

M. B. Olds, Cheboygan, Mich., has purchased a coal dock at Cheboygan, and contemplates installing modern equipment for unloading and fueling.

The freighter D. O. Mills, building for Pickands, Mather & Co., at the Ecorse yard of the Great Lakes Engineering Works, will be launched on Saturday next.

A revised chart in colors of Beaver Island Group, Lake Michigan, has just been issued by the United States Lake Survey office and is for sale by the MARINE REVIEW.

The steamer H. P. McIntosh, building at the Bay City yard of the American Ship Building Co. for the Gilchrist Transportation Co. will be launched March 2.

The steamer building at the yard of the Toledo Ship Building Co. for the United States Transportation Co. will be launched March 9, and will be named in honor of Charles Hubbard.

Capt. Frank Root, local manager of the Great Lakes Towing Co. at the Sault, reports the ice to be 30 in. thick there and does not believe that navigation will open before April 20.

The Kensington Steamship Co. has filed a certificate of incorporation at Buffalo. John J. Boland, Fred W. Ealey, Wm. Brooks, Adam E. and I. E. Cornelius, all of Buffalo, are directors.

Col. Charles E. L. B. Davis, United States district engineer at Detroit, is asking for proposals for removing lime stone bed rock at the Lime Kiln crossing. Bids will be opened March 18.

Senator Burrows has succeeded in passing in the senate a bill to appropriate \$50,000 for a lightship to be stationed at the easterly end of Southeast Shoal near North Manitou Island, Lake Michigan.

Capt. Harry May of Cleveland, who was master of the steamer Dobbins last year, has bought the little steamer Arcadia from the Milwaukee tug boat line. He will operate her in the lumber trade.

The steamer G. J. Grammer of the Seither fleet, which was driven ashore at Buffalo during the windstorm last month, was successfully released after a fair part of her grain cargo had been lightered.

The Miami Lumber Co. of California has purchased the steamer C. F. Curtis from the Tonawanda Iron & Steel Co. of Tonawanda. The Curtis was built at Marine City in 1882 and is 196 ft. long, 32 ft. beam and 13 ft. deep.

The Manitowoc Dry Dock Co., Manitowoc, Wis., has been given a contract to construct a stone scow for the Great Lakes Dredge & Dock Co., of Chicago. The scow will be 200 ft. long, 38 ft. wide and 13 ft. deep.

The Detroit river tunnel is scheduled to be completed on June 1, 1909. Any delay after that date will cost the contractors \$1,000 per day. They will, however, receive \$1,000 for every day's

time that it is completed before that date.

Capt. J. B. Watt, commodore of the Cunard line, who brought the Carmania out, is to have command of the express liner Lusitania.

The American section of the International Waterways Commission will meet next Saturday morning at the Federal building, Buffalo. The subject under consideration is the form of permit for users of water from the Erie canal for power purposes.

Judge Humphrey, of Chicago, has decided the case arising from the collision of the little wooden schooner Mills and the package freighter Milwaukee, in St. Clair river last fall, which resulted in the sinking of the Mills. The court finds both steamers equally to blame.

The old wooden steamer Minnie E. Kelton has been sold by the International Salt Co. to the Miami Lumber Co. of San Francisco. The steamer will be fitted for salt water service at once and will be employed in the lumber trade of the Pacific. It is understood that negotiations are on for the purchase of several small lake steamers for Pacific trade.

A passenger license has been obtained by the Marquette & Bessemer Dock Co., owners of the car ferry Marquette & Bessemer No. 2. Crew's quarters are being constructed aft of the boat so that the deck cabins may be used for passengers. A new service from Conneaut to Port Stanley will begin April 15.

The steel steamer Hugoma, which was built by the Detroit Ship Building Co. in 1901 for the Morleys of Marine City, was sunk in collision with the French cruiser Kleber off New Orleans last week. Several firemen and coal passers were drowned. The Hugoma was sold some time ago to the New York & Porto Rico Steamship Co.

Upon a libel of \$6,250,000 filed by Capt. Harris W. Baker of Detroit, the wooden steamer H. B. Tuttle has been seized by a United States marshal. After the Tuttle was wrecked at Sandusky last season the vessel and cargo were sold by C. E. Benham of Cleveland to Amos Smart of Detroit. Capt. Baker raised her and took her to Detroit. He now sues to recover his salvage claim.

The Bessemer Steamship Co. has won the suit against the Northern Steamship Co. and has been awarded \$34,871.06 by Judge Hazel in the United States circuit court at Buffalo. The Bessemer Steamship Co., owner of the steamer Sir Wm. Siemens and the barge Alexander Holley, sued the Northern Steamship Co., owner of the steamer North Star, for damages as the result of a collision. Since that time the Siemens and Holley have been taken over by the Steel Corporation.

DEATH OF W. C. McMILLAN.

Wm. C. McMillan died at his home in Detroit on Thursday last. His battle with pneumonia and heart disease had extended over a period of eight weeks, and though hope was several times abandoned, he surmounted complications that were even surprising to his physicians. Three crises were met and survived, and his family began to hope. The terrible struggle for life, however, had so ex-

hausted his strength that when it became necessary to relieve, by tapping, the right pleural cavity, he had not sufficient strength left to rally. Mr. McMillan's illness had really dated back two years, when through stress of business his heart became seriously dilated and developed chronic myocarditis.

Mr. McMillan was a man of most extraordinary physical and mental capacity. He made a pronounced success in business and was a profound student of the sciences, with especial reference to medicine, chemistry, biology, psychology, and the origin of species. His medical library was the most extensive in Michi-

gan. He was born in Detroit on March 1, 1861. He entered Yale University in 1880, graduating from that institution in 1884. He then spent some time in London, where he was married to Miss Marie Louise Thayer of Boston. Returning to Detroit he entered the employ of the Michigan Car Co. in a subordinate position. His executive qualities, however, were marked, and he was appointed general manager of the company three years

later. In 1892 he was instrumental in effecting the consolidation of the Michigan and Peninsula Car Companies, which in 1899 were absorbed by the American Car & Foundry Co. After the death of his father, Senator James McMillan, he became the executive head of the McMillan estate.

Mr. McMillan was deeply interested in the commerce of the great lakes. It was he who organized the new Detroit & Buffalo service, spending \$1,300,000 in building two steamers that would make the run in less than fourteen hours. There was much misgiving concerning this enterprise by capitalists, but the re-

sults have proved the soundness of Mr. McMillan's judgment. Flattering offers were from time to time made to Mr. McMillan to assume charge of important interests in the east, but he could never be persuaded to leave Detroit. He was a candidate for United States senator at the recent election in Michigan, but the condition of his health prevented him from pursuing an active campaign. He is survived by a widow and two children. Following is a list of the enterprises in which he was engaged:

Detroit & Cleveland Navigation Co., president and general manager.

Detroit & Buffalo Steamboat Co., general manager.

Michigan Steamship Co., director.

Wolverine Steamship Co., director.

Duluth & Atlantic Transportation Co., vice president.

Detroit Shipbuilding Co., president.

American Shipbuilding Co., director.

Michigan Malleable Iron Co., president.

Detroit Seamless Steel Tube Co., president.

Monarch Steel Castings Co., president.

Detroit Railroad Elevator Co., treasurer.

Detroit Iron Furnace Co., secretary.

Peninsular Sugar Co., director.

Detroit Union R. R. Depot & Station Co., director.

Michigan State Telephone Co., chairman executive committee.

Union Trust Co., chairman executive committee.

First National Bank, director.

State Savings Bank, director.

Grace Hospital, treasurer.

Detroit Walker-Gordon Laboratory Co., president.

The Detroit Hotel Co., president.

Cass Farm Co., Ltd., director.

Detroit Manufacturers' Railroad, treasurer.

Cleveland & Toledo Line, president and general manager.

Mutual Life Insurance Co. of New York, trustee.

Frank Whitney Painting Co., president.

Pontchartrain Hotel Co., president.

Jenkins Bros., 71 Johns St., New York, have recently issued a catalog devoted to valves and packing. The preface contains the following announcement, which is certainly very fair: "If you will put a Jenkins Bros. valve on the worst place you can find, where you cannot keep other valves tight, and if it is not perfectly tight, or does not hold steam, oils, acids, water, or other fluids, longer than any other valve, you may return it and your money will be refunded." The catalog is complete, giving complete descriptions with dimensions of valves and price lists of parts.



WILLIAM C. McMILLAN.

MORSE BUYS WARD LINE.

Control of the Ward line formally passed to Charles W. Morse last week. Mr. Morse and his associates have acquired 14,000 shares of the stock of the New York & Cuba Mail Steamship Co., which were held by H. P. Booth, president of that company, and 6,000 shares from other stockholders, making 20,000 shares out of a total of 25,000 shares representing the company's \$2,500,000 of capital stock. The remaining stockholders will have an opportunity to sell their stock to Morse and his associates at the same price understood to be something over \$600 a share.

The new New York & Cuba Mail Steamship Co., which is to be formed with \$10,000,000 of 5 per cent bonds and \$20,000,000 of stock, will be organized under the laws of Maine. This company will replace the present company of the same name. The temporary certificates of stock in the new company are expected to be ready for delivery in about two weeks.

The earnings of the Ward line in the last year, it was said by bankers interested in the change in control, amounted to about \$1,350,000 or 54 per cent on the capital of the old company. On this basis the line is earning enough to pay the interest on the \$10,000,000 of new bonds and show a surplus of \$850,000, equivalent to 4 1/4 per cent on the \$20,000,000 stock of the company.

NAVAL BILL PASSES HOUSE.

The naval appropriation bill, carrying a little over \$95,000,000, passed the house Feb. 15, after five days' consideration. Representative Burton made a fight against the building of the additional 20,000-ton battleship called for in the bill and offered an amendment striking out the provision for it, but his attempt was not successful. The house voted, 146 to 111, for the battleship, which is to cost \$10,000,000.

The only material change in the bill made was the striking out of the provision for a brass and steel forge at the Washington navy yard. The putting in of this forge would have been a blow to the Midvale and Bethlehem steel companies, which have been forging the brass and steel for the guns.

An amendment was adopted limiting to \$800,000 each the cost of the two torpedo-boat destroyers authorized in the bill, exclusive of armament.

Another amendment was adopted, providing that of the vessels authorized in last year's naval bill, as well as in this year's, "not more than one battleship and one torpedo destroyer or two torpedo-boat destroyers shall be built by one

contracting party." Both these amendments were presented by the chairman of the committee, Mr. Foss.

NO ADVANCE IN RATES.

Representatives of foreign marine underwriters have denied the reports which had again gained credence, that a general advance in full cargo rates had been ordered.

The summary of the recently issued reports of the principal marine insurance companies is convincing evidence, however, of the unprofitable nature of underwriting business during the past two years. It may be recalled that owing to the large losses sustained by the underwriters in the Russo-Japanese war the first year's settlements on account of 1905 were unusually heavy. The American business was also unfavorably affected by the abnormally large number of casualties on the great lakes. It was therefore anticipated that the general results of working for the whole year would prove exceptionally unfavorable. These anticipations have been fully realized.

The early months of 1906 were distinctly favorable to the underwriters, but during the latter part of the year the severe hurricanes and cyclones which were experienced resulted in many casualties, and present indications do not point to the conclusion that the underwriting account for 1906 will, generally speaking, be a profitable one.

DIRECT STEAMSHIPS NEEDED.

Consul J. W. O'Hara, of Montevideo, reports on the methods to be employed to enable the American manufacturer and exporter to secure a larger share of the trade of Uruguay and the countries tributary to the River Plate. He writes:

"I have been requested to give in some detail the methods to be employed to enable the American manufacturer and exporter to secure a larger proportion than they now enjoy of the markets of Uruguay and the countries tributary to the River Plate.

"In my opinion the first and most important requisite is that the American manufacturers and exporters be in real earnest, that the same methods be employed, the same energy and capital be expended in securing these markets, that would be devoted to the promotion of any other enterprise from which ample returns were to be expected.

"The first question that will naturally arise in the mind of the capitalist with money to invest, the manufacturer seeking a market for his surplus products, and the exporter desiring to extend his business is, Will it pay? A first-class line of steamships, plying between New York and the River Plate, with ample accommodations for passengers, mail, and cargo, would not at the outset yield such dividends as would be satisfactory to investors unless given additional assistance. But its continued existence would foster and extend a trade that would in time bring rich results. It would inspire these people, who are growing more friendly toward us, with confidence in our commercial ability, and answer the question which has often been asked by them on seeing the flags of so many other nations constantly in these waters. 'Where is the American merchant marine? If Americans desire an inter-oceanic trade with us, why do they not establish it by sending their ships?' The people here admire the 'Great Republic of the North' and Secretary Root's recent visit has increased their interest. Frequently the desire is expressed to visit the United States, but they can not afford the time to go by way of Europe, and there are no first-class accommodations direct."

STEAMSHIP LINE'S BIRTHDAY.

The North German Lloyd Steamship Co., recently celebrated its fiftieth anniversary and it is interesting to recall that the company started with four screw propellers, the first arrival at New York being the Bremen, 1,000 tons, on July 4, 1858. Today the company has some of the finest vessels afloat, viz., the Kronprinz Wilhelm, the Kronprinzessin Cecilie and the Kaiser Wilhelm der Grosse. The present fleet of the company consists of 395 vessels of 754,441 gross register tons and 571,670 horsepower, of which 92 are ocean-going steamers, 50 are coast-wise vessels, 50 are river steamers and two school ships for the training of officers for the company's service. There are 201 barges and lighters.

MARINE PATENTS.

Copies of these patents can be obtained by sending ten cents in stamps to Siggers & Siggers, patent lawyers, suite 11, National Union Building, Washington, D. C., by mentioning THE MARINE REVIEW.

- 842,908. Foldable or Collapsible Boat. Ira O. Perring, Kalamazoo, Mich., assignor to Life-Saving Folding Canvas Boat Co., Kalamazoo, Mich.
- 843,016. Hull for Ships. Olaf Holby, Christiania, Norway.
- 843,021. Oar-Lock and Socket Therefor. James Lackie, and Frank M. Poston, Bremerton, Wash.
- 843,357. Hull Cleaning and Friction Reducing Apparatus. William A. Partee and John C. Wharton, Nashville, Tenn.
- 843,390. Ship for Carrying Liquid Cargoes in Bulk. Charles E. Burney, Newport News, Va.
- 843,458. Anchor for Ferry-Boats. Martin M. Hoes, Long Island City, N. Y.
- 843,803. Marine Engine Governor. Simon A. Fraser and John M. Nichols, Lorain, O., assignors of one-third to John J. Kelley, Lorain, O.
- 843,822. Reefing Gear. Daniel C. Jennings, North Falmouth, Mass., assignor of one-half to Arthur M. Alger, Taunton, Mass.

At the annual meeting of the stockholders of the Great Lakes Towing Co. held in Jersey City, N. J., last week, the old directors were re-elected as follows: Gen. G. A. Garretson, L. M. Bowers, L. C. Hanna, H. G. Dalton, C. W. Elphicke, Capt. James Ash, R. R. Rhodes, C. E. Grover, James Davidson, A. B. Wolvin, Edward Smith, D. Sullivan, John A. McGean, T. F. Newman and Wm. Livingston.

LAKE SHIP YARD METHODS OF STEEL SHIP CONSTRUCTION.

BY ROBERT CURR.

THE ADVANTAGES OF MOLD WORK.

The greatest advantage derived from the mold system is the continual working of the machinery in the punch shop

straight line. The keel plate and liner measure approximately two inches and D strake and liner one and one quarter inches, so that the height above the keel plate will measure three and three-quarters inches at end of straight line where the curve of bilge commences, shown

because the bottom framing is all riveted on the ground prior to erecting and when fastened to the center keelson pulls the shell plating in place if it should be nearer a straight line than the rise designed.

When the plating is put upon the bottom the straight edge will be used every hundred feet so that the plating will require less bolting up when the framing is placed on the plating than when wholly dependent on the eye. To hold the plating in place shores of scantling size are used which serve the purpose until the bulk of the bottom material is in place.

The top sides are proceeded with as soon as the margin plate is on. The belt frames are erected and all the length-way parts run so that the frames are attached to same, the longitudinal parts serving the purpose of ribbands.

The deck work follows in the same way and as soon as the arch plates are in the girders under the deck are run and the beams are rested on and bolted to same.

The intercostal work is all riveted up, then the shell and stringer plating is erected in place without the aid of either shores or ribbands.

The erecting of the material where all the parts can be completed effects a saving in time and cost and the wood

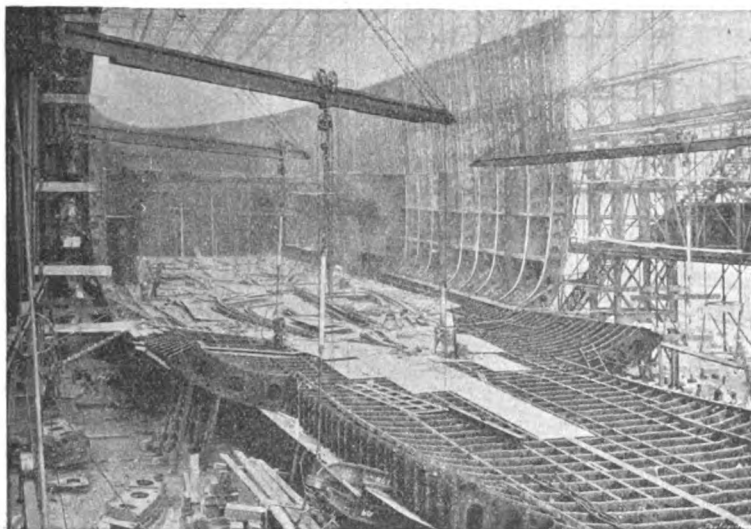


FIG. 172.

from the beginning to the launching of the vessel. This cannot be accomplished on a single vessel by the old method of lifting the work from the ship. Where two or three vessels are building at one time the punch shop tools may be kept going continuously, but otherwise on the old system.

The despatch of the building of a vessel depends entirely on the output of the punch shop and when six men can furnish work for 13 punching machines working night and day it goes to show the advantage of the mold system.

With the mold system of laying out the material, two building berths are ample for any large concern, because in a few days after the punch shop work is done the vessel can be launched, providing the machinery space of the vessel has been got ready for the engine and boiler builders to get same installed. In the mold system any part of the vessel can be built first so that there is no trouble in getting the engine and boiler space ready first. The riveting as explained is well cleaned up so that no odd work is left, which is a large item both in economy and despatch.

The ribbanding of a vessel is quite an item and is practically dispensed with on the great lakes. The bottom plating is put up along with the keel plating and center keelson as shown by Fig. 179. The bottom of the vessel has a rise of three inches in the width and this is taken care of as shown by Fig. 179.

A straight edge is held to the underside of the keel plate and the difference measured at D strake, the ending of the

by Fig. 179. In this way the bottom is tested as regards the rise of floor.

Very little trouble is experienced in fetching the bottom to the proper rise

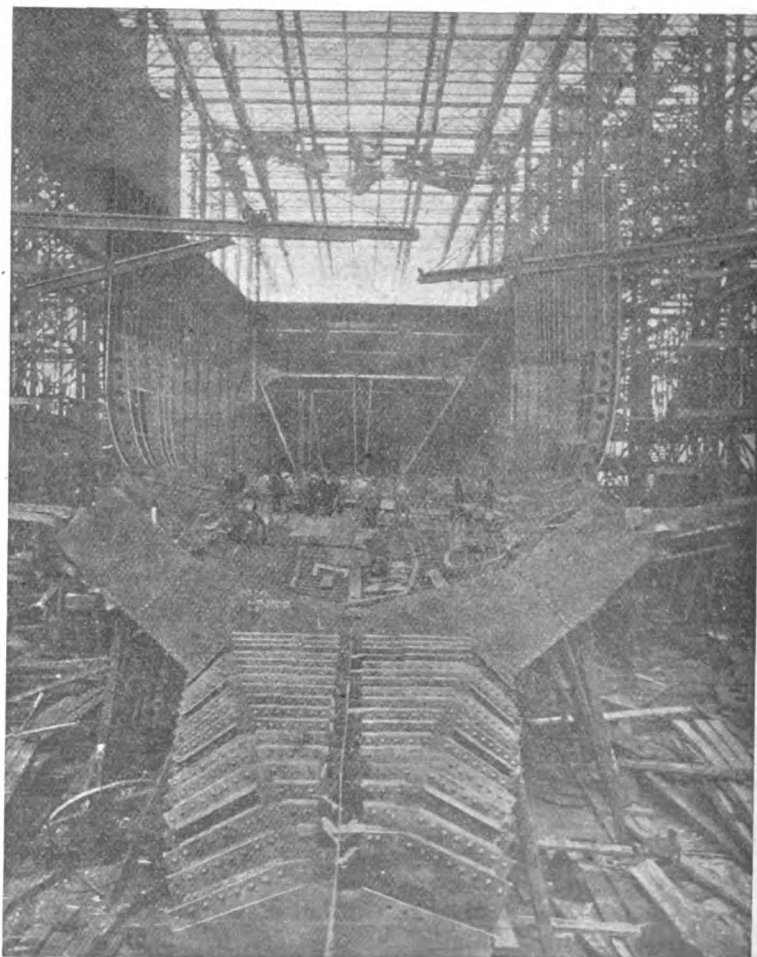


FIG. 173.

VIOUS YEARS.

27

Compiled by THE IRON TRADE REVIEW, Cleveland.

NAL	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	TOTALS.
Mes												
Ada		27,831	110,821	98,847	104,510	93,025	119,940	63,429		1,370		1,370
Adr	138,209	183,296	95,809	149,594	295,821	337,807	404,645		110,993	107,886	81,164	1,262,796
Aet		2,045						477,212	646,203	522,035	374,944	4,921,305
Ag								18,750	100,864	31,901	16,577	274,943
Ala								17,326	64,664	123,236	151,114	676,081
Ale						80,915	51,639					65,069
Aub								36,593	129,035	246,581	132,420	1,252,566
Bea	235,895	618,589	420,318	643,402	724,768	940,513	929,937	929,701	956,812	2,088	4,242	15,773
Biw	10,300	70,867	87,202	24,623	14,199	126,290	97,631	19,963	186,798	704,051	541,324	97,453
Bru	174,921	208,880	93,707	98,283	250,687	117,296	53,342	77,799	112,704			14,347,841
Bur		13,037	44,526	95,210	128,233	147,346	197,770	230,614	195,555	5,051	1,617	942,703
Can						20,210	38,209			117,096	180,983	2,460,997
Cas			3,395	41,942	76,877	100,902	141,148					1,619,811
Chi					5,009	10,980		178,800	183,052	111,851		58,419
Cin	24,538	90,885	47,081	31,062	49,381	7,458	49,203					837,967
Clo		2,107							2,816	5,365		65,192
Col	2,726	22,820	35,136	37,594	93,663	74,235						1,177,654
Con							35,756	15,395				17,042
Cor								130,798	95,877		153,452	2,167,519
Cro			14,643		33,851	43,316	98,550		14,455	61,694	132,380	11,988
Cro								123,261	42,470	100,751	68,318	366,870
Cyp		949	94,645	96,032	69,865	110,269	72,413	11,444	7,599	1,294	4,737	1,400,743
Day		1,201					149,966	149,966	123,331	79,420	136,232	26,123
Dul						3,496	11,008	20,355	74,596	53,828	38,288	1,276,322
Eib						6,410	2,503					210,683
Fay		19,441							3,373	7,339		20,229
For	2,600					4,900						28,630
Fra						67,652	31,323		47,267	43,736		93,101
Fra	55,983	53,160	34,334	54,104	68,447	43,622	72,959	19,727	7,747	15,606	29,393	513,251
Gen				37,182	60,739	64,824	61,219	54,985	128,300	87,939	17,577	239,256
Gle	77	1,071		216		86,607	90,155	74,113	31,181	51,440	64,720	589,274
Gra	13,062	10,924	21,815	10,374	17,430	15,194	14,922		53,272		79,163	750,120
Hav								12,133	25,935	40,860		113,375
Hec								2,397				335,365
Hig									6,913			9,310
Hol									8,739		32,332	180,708
Hu											9,086	319,682
Hu	175,274	290,622	179,917	237,886	223,713	229,651	1,316	1,324	17,280			35,810
Hu	304,010	262,551	273,587	279,855	305,072	530,129	197,606	358,126	273,443	9,863	11,257	296,484
		761				11,050	374,043	507,786	343,543	343,543	141,948	3,854,005
							25,967	66,383	530,291	489,175	372,791	6,629,110
												499,756

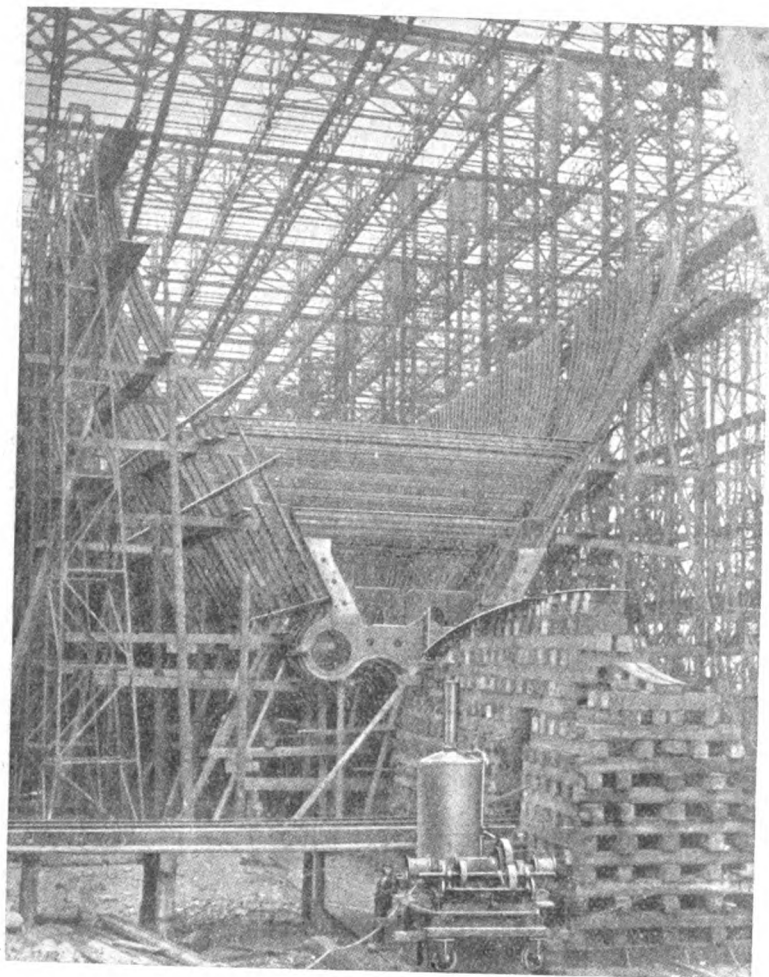


FIG. 174.

work can be got out completed from the lines, which finds more accurate steel work and makes better work of same.

The shoring of a lake vessel is not elaborate compared to the vessel built for end-on launch. Fig. 179 shows all the shoring there is to a vessel built on the lakes; the shores have the same spacing as the keel blocks and remain until the vessel is about to be launched.

Cribs, about four on each side, are built under the bilges and this is all that supports the vessel until she is launched. The vessel being launched sideways sits plumb on the keel blocks so that the bracing and shoring is not required like the vessel built to a declivity. The vessel built plumb from the keel blocks has a great many advantages over the vessel built with a declivity. Fig.

180 shows two vessels, A built for side launching and B for end-on launching. The vessel B for end-on launching is 25 feet higher at the bow than the vessel A. It is a well-known fact that men will do more work nearer the ground than too high above it.

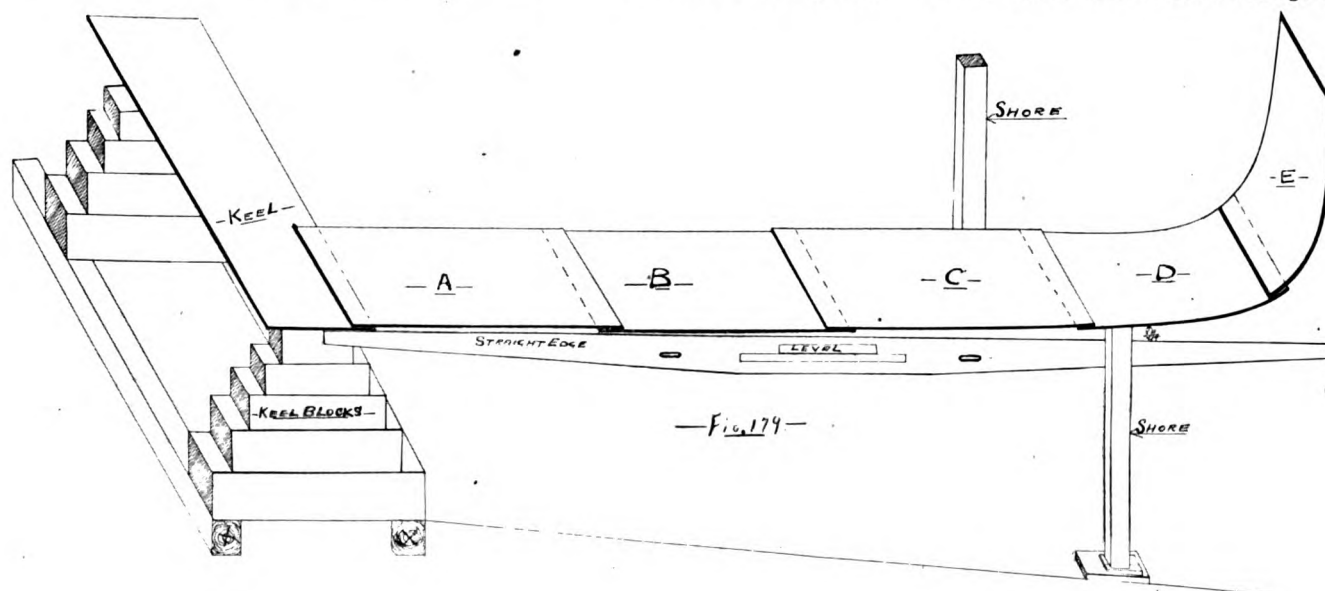
The use of declivity battens and plumbs for the end-on launching are more troublesome than the plumb and level when the vessel is built on the old style, but with the mold system it would make little difference, seeing that after the first few frames were erected to position the material would work into its own place.

The laying out of ship work in the ship yard is somewhat behind the structural iron work on a large building. I superintended the 16-story Rockefeller building in Cleveland, O., for the owner, which was designed by Knox & Elliot, of Cleveland, O., and I was surprised to see 2,000 tons of material laid out with a steel tape, and the class of work would put the ship builders to shame. I tested every rivet in the building and only found half a dozen slightly jarred rivets in the whole lot. Fig. 181 shows the steel work above the sidewalk on June 16, 1904. Fig. 182 shows the work done on August 13, 1904, nearly a month later. Fig. 183 shows the steel work practically completed on Sept. 24, 1904. For erecting the steel of a building of this size three months is considered the time. Fig. 184 shows the building nearly completed April 17, 1905.

REPAIRING VESSELS.

Some very large repairs have been done on the lakes with economy and despatch. Fig. 185 shows the starboard bow repairs to the steamer R. L. Ireland in dock at Superior, Wis. Fig. 186 shows the port side of bow of same vessel. Fig. 187 shows port side stern view of R. L. Ireland in the dock.

These figures show a usual damage to



vessels on the lakes and the views shown in previous issue of MARINE REVIEW show the docking of this vessel in the beginning of February, which explains the trouble experienced in docking a vessel in the beginning of year and the great

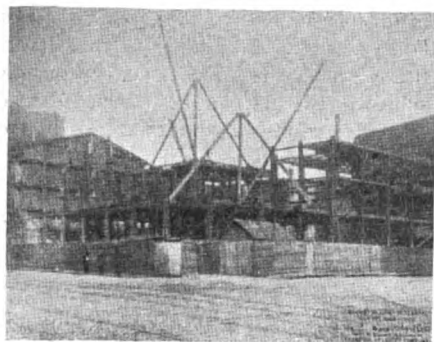


FIG. 181.

amount of patience necessary in doing same.

There are 2,572 vessels trading on the great lakes and 22 dry docks for taking care of same when they need repairs. Something like \$15,000,000 is paid out every year for repairs. Every vessel on

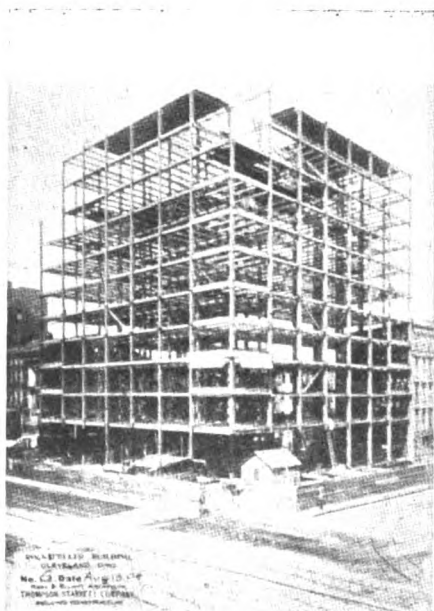


FIG. 182.

the lakes is examined and repaired when in need after it is laid up every season, so that when navigation opens in the spring all the vessels are in first-class condition.

SHIP MASTERS' ASSOCIATION ELECTIONS.

Buffalo Lodge No. 1: President, J. J. Hartman; first vice president, M. S. Peterson; second vice president, Peter Thompson; treasurer, John B. Hall; secretary, Charles McWilliams; chaplain, J. H. Coleman; marshal, Dan Coughlin; warden, Harry Warwick; sentinel, P. O. Neil.

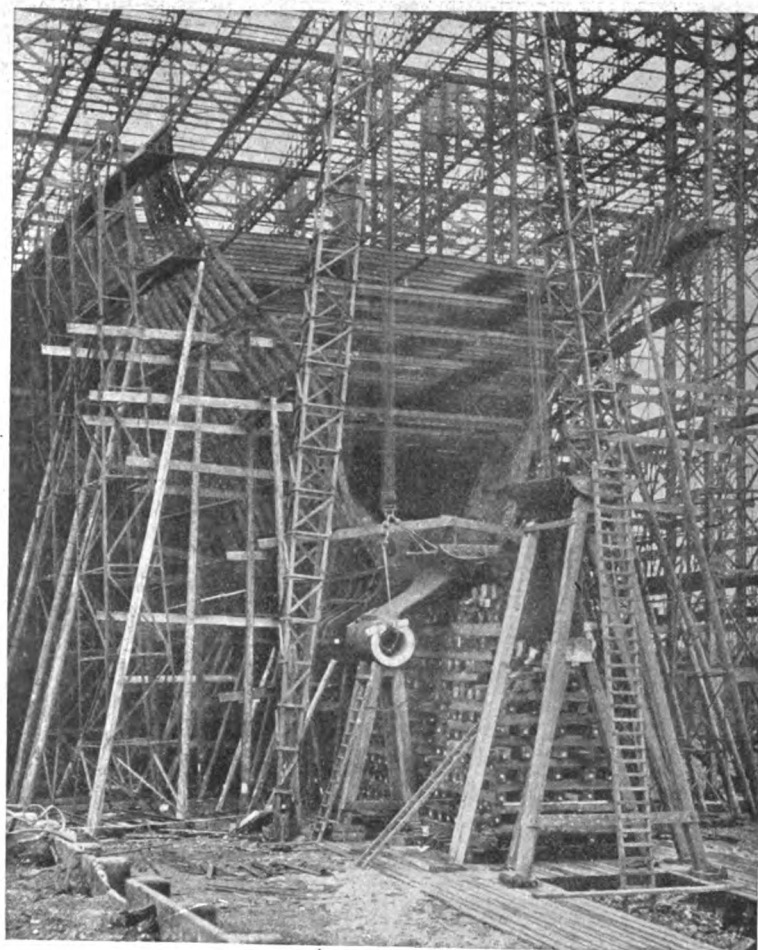


FIG. 175.

Chicago Lodge No. 3: President, Thomas Beggs; vice president, J. E. Kohnert; second vice president, Wm. Disher; treasurer, Wm. W. Shaw; treasurer, F. B. Higbie; delegate to grand lodge, Thomas J. Beggs; alternate, Thomas M. Hough.

Cleveland Lodge No. 4: President, H. A. Byrns, first vice president, Lafayette Stough; second vice president, Robert Thompson; treasurer, F. L. Leickie; secretary, Carlton Graves.

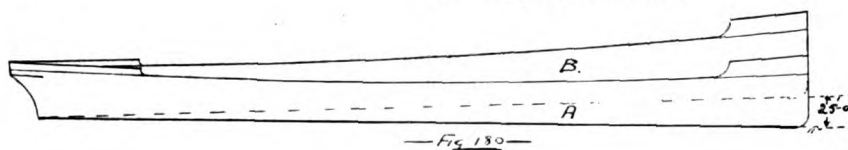
Milwaukee Lodge No. 6: President, Anton Christenson; first vice president, James McGinn; second vice president, F. A. Dority; treasurer, F. C. Makon; secretary, John McSweeney. Delegate to grand lodge, A. Christenson.

Toledo Lodge No. 9: President, D. F. Denville; first vice president, James B. Lyons; second vice president, Andrew Stalker; secretary and treasurer, E. G. Ashley; chaplain, John Cunningham; marshal, James McKinley; warden, Byron Warner; sentinel, John Dunseith.

ADJUSTING THE COMPASS.

An improved apparatus for adjusting the compass at sea without sights has recently been patented by Kelvin & White, Ltd. This apparatus consists of an improved form of Lord Kelvin's deflector for compass adjustment in which a compound magnet consisting of four bar magnets is mounted on two frames jointed together, and is so placed as to give a horizontal magnetic force on the compass needles of magnitude varied by altering the angle between the two frames. According to this invention two steel magnets are carried by brass holders, jointed together at the top by a soft iron washer and having fork prolongations downwards designed to carry the nuts which work on the two halves of the long screw shaft supported in bearings forming part of a sole plate attached to which is a pointer showing approximately the position of the line of magnetic force, relatively to the compass card.

The British admiralty is building a repair ship of 11,000 tons.



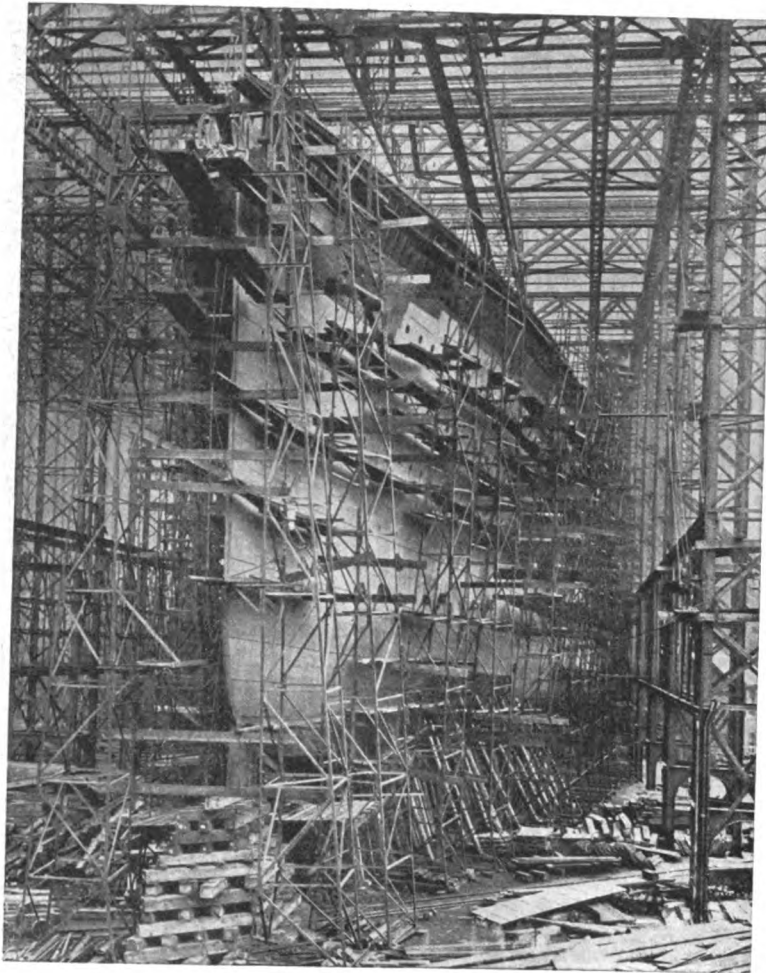


FIG. 176.

STEERAGE SERVICE INQUIRY.

According to present plans a serious and thorough investigation of conditions in the steerage passenger service of ves-

Probably the broadest object of the proposed changes is that of bringing our passenger act into conformity with those of foreign nations. At the present time

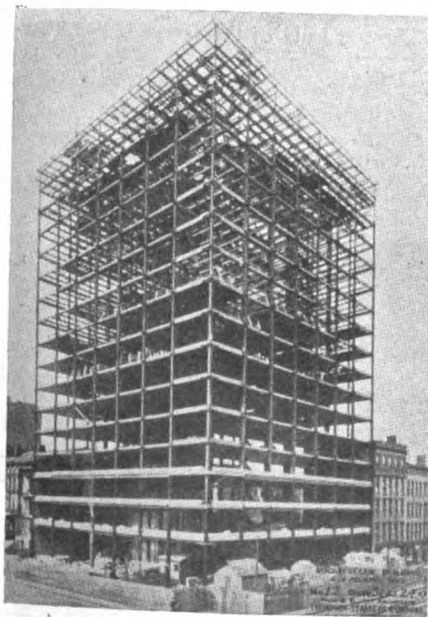


FIG. 183.

sels leaving American ports will be begun by officials of the Department of Commerce and Labor shortly after the close of the congressional session.

there is great diversity in this matter. Considerable agreement is found in the acts of foreign countries on this subject, but our own act is in wide disagreement

with practically all of them. As matters stand there are a number of points, therefore, in which strict observance of our passenger provisions would compel the companies to violate the acts of the ports at which they touch on the other side of the water, while, on the other hand, observance of the acts of their home countries would compel them practically to violate our legislation on the subject. It has already been learned that the steamship companies are in entire sympathy with the desire of the department to have the system of fines for infraction of navigation regulations and the like altered in such a way as to make the fines correspond in amount to the nature and gravity of the offenses. They also favor making the fines stable and compelling their imposition at fair rates instead of leaving them to the option of the officials of the department, as is at present the practice.

The Great Britain, Ireland and Canada express route is the title of a syndicate formed in London for the purpose of establishing a fast line of steamers between Blacksod Bay, County Mayo, Ireland, and Halifax, N. S., with the necessary rail connections in Ireland. It is reported that Vickers Sons & Maxim, of Barrows-in-Furness, England, and Swan & Hunter, Newcastle-on-Tyne, are interested in the project. The distance between Blacksod Bay and Halifax is 2,100 miles, which could be traversed in 3½ days by 25-knot steamers. Mr. R. Bickerdike of Montreal is the Canadian representative of the syndicate and he in-



FIG. 186.

tends to bring the matter officially before the Dominion government. It is intimated the project has the cordial endorsement of Lord Strathcona.

EMPIRE SHIP BUILDING CO.

The Empire Ship Building Co. has a splendid site and plant for doing repairs and building vessels. The ship

The work on hand consists of two steel scows of 55 cubic yards capacity for the Empire Engineering Corporation of New York, one steel sand sucker

ting quite a lot of repair work, for it has twenty-four steel vessels, on which it is doing repairs. The most notable repair job is the Spokane. On this vessel the company is removing the planking from the main deck and wid-

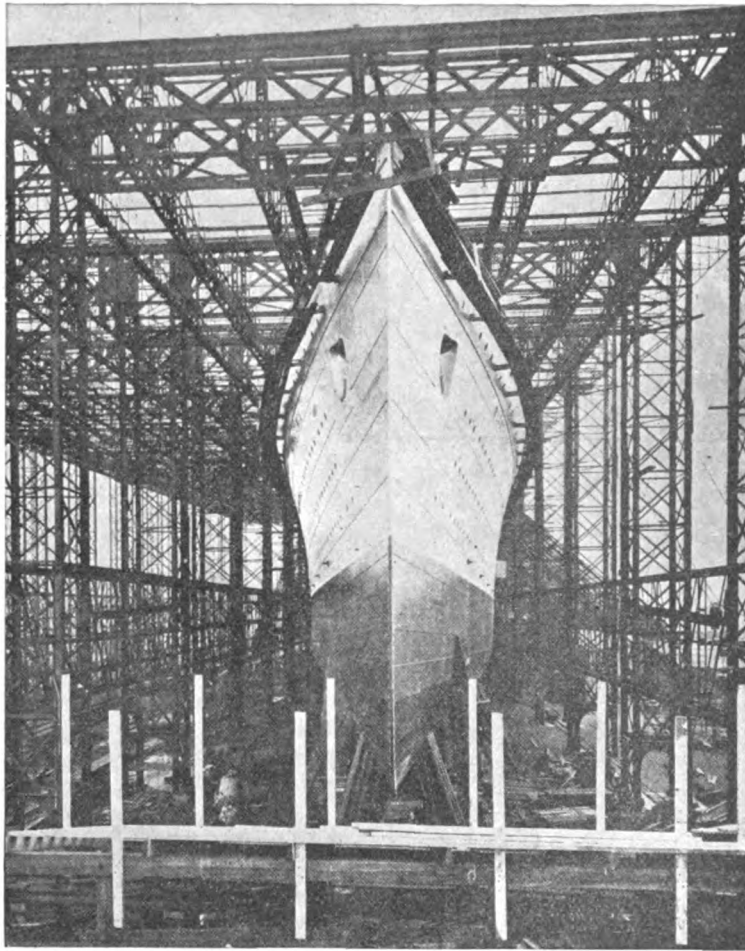


FIG. 177.

yard extends on the water front about 700 ft. and is the best location on the chain of lakes for the repairing and building of vessels. Every machine in the shops is run independently by motors and a system of pneumatics is carried on throughout the plant. The riveting of the repair work as well as the new work is done by machines and the work shows up well in quantity and workmanship. The company is installing a very large steam hammer, one of the largest of its kind in the country and intend doing business in the forging line which looks very promising.

This plant extends from the water front to the railroad tracks and all material can be shipped into the ship yard without second handling, which effects a considerable saving in cost. A new steel dry dock is under construction which will be as large as the one owned by the Great Lakes Engineering Works at Ecorse, Mich. The dock when completed will enable the Empire Ship Building Co. to dock and repair a boat over 600 ft. long.

for D. H. Hymann, Rochester, N. Y., 140 ft. by 33 ft. by 9 ft., designed by Henry Rice, naval architect; Buffalo, N. Y., to be the very latest and up to date of its kind. This company is get-

ening and lengthening the hatches. The stanchions at the hatches are also being braced with large bracket plates with double face angles and a new main deck stringer 36 in. wide by $\frac{1}{2}$ -in. thick is being fitted from the fore-castle to the boiler room bulkhead. New steel coal bunkers are also being installed. The company is employing about 500 men at present.

The tug Lutz of the Great Lakes Towing Co.'s fleet was crushed in the ice at Port Huron last week and will have to go into dry dock for repairs.



FIG. 187.



FIG. 184.

NAVIGATING DETROIT RIVER.

There is a new name for the Lime Kiln crossing. President Livingstone of the Lake Carriers' Association has

ington during the week to urge a modification of the proposed rule, limiting the proscribed distance to that part of the river between the lower gas buoy

chief of engineers, and Col. Charles E. L. B. Davis, district engineer at Detroit, in conjunction with lake vessel interests. Undoubtedly the rules will be so defined as not to seriously interfere with the express schedules of the passenger lines.

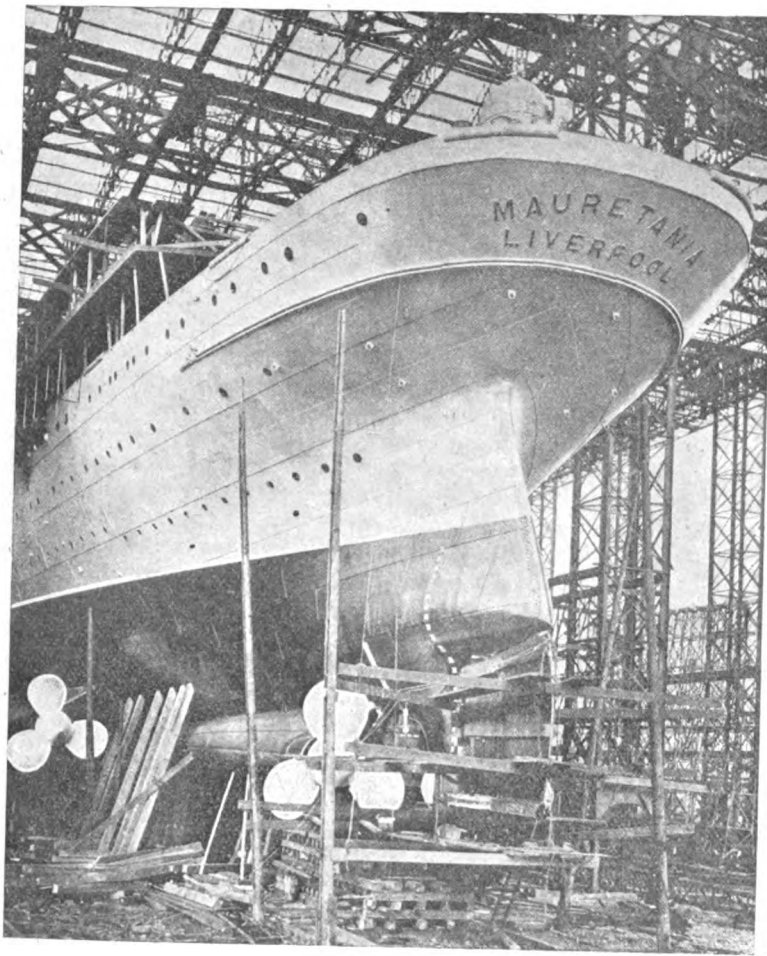


FIG. 178.

referred to it as the Hell Gate of the great lakes. During the week Mr. Livingstone and Mr. Goulder have urged upon the war department the necessity of providing rules for navigation at the crossing and their enforcement by a patrol vessel. The war department has acceded to this request. The committee of captains, officially known as the Lake Carriers' Auxiliary Committee on Aids to Navigation, have recommended that no loaded boats be allowed to pass one another between Mamajuda and Bar Point bound down, passenger boats excepted; but that no downbound passenger boat shall pass another boat going in the same direction inside the stakes between the upper can buoy abreast of Ballard's Reef and the lower end of Bois Blanc Island. This rule is not agreeable to the passenger lines, especially the Detroit & Buffalo line, which maintains an express service between Detroit and Buffalo.

A. A. Schantz, general superintendent of the Detroit & Buffalo Line, and Capt. Alexander J. McKay, of the Detroit & Cleveland Line, visited Wash-

ington during the week to urge a modification of the proposed rule, limiting the proscribed distance to that part of the river between the lower gas buoy

below Ballard's Reef and the head of Bois Blanc Island.

The whole matter is being considered by Gen. Alexander McKenzie,

CANADIAN SHIP CHANNEL.

That good progress has been made in deepening and widening the ship channel between Montreal and Quebec is shown by the report of the superintending engineer, F. W. Cowie, to Lt. Col. F. Gourdeau, deputy minister of marine and fisheries.

The work reported upon includes the dredging away of a shoal in Montreal harbor, a channel through Lake St. Peter and important work at Cap a la Roche and Cap Charles, where the work will be centralized this season. The report says in part:

"With the depth of 30 ft. completed between Montreal and Batiscan, that depth is therefore available for the whole distance between Montreal and Quebec by waiting for high tide for the division between Batiscan and Quebec. The announcement of the completion of an available channel for navigation, between Quebec and Montreal, of 30 ft. at extreme low water, cannot fail but be of very great importance to the trade of Canada. On the opening of the season of navigation of 1907 the gage at Sorel will be changed and an additional draught of nearly four feet given. Compared with the lowest stage of water in 1906, the depth would be increased from 26 ft. 10 in. to 30 ft. 6 in."

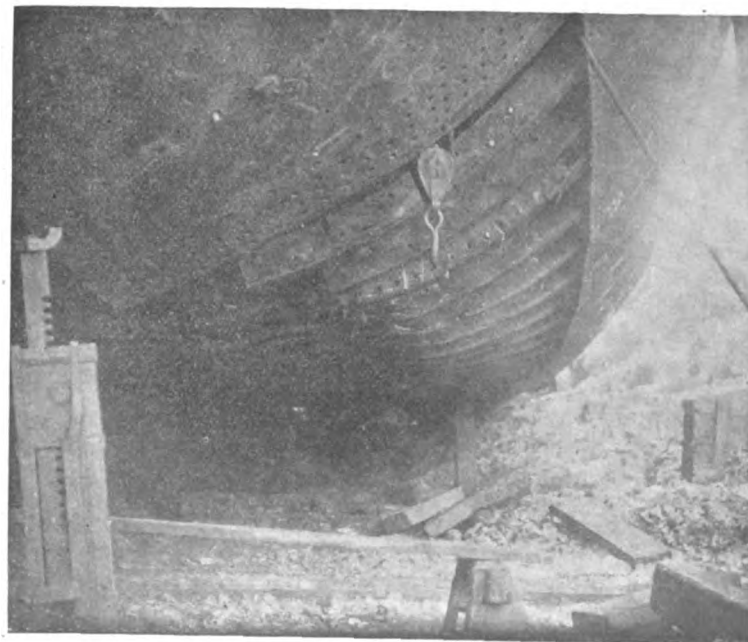


FIG. 185.

SCIENTIFIC LAKE NAVIGATION

By Clarence E. Long

It will be seen from the foregoing table of deviations that the zero or neutral line of the ship's magnetism coincides with the correct magnetic points $N\frac{1}{4}W$ and $S\frac{1}{4}E$, very nearly, for this particular compass. Under certain conditions this neutral line would also show approximately the direction of the ship's head at the time of building. When a compass is so placed as to be free from the magnetic effects of vertical iron, and the iron used in equipping the ship, such as the engines, boilers, smokestacks, steel masts, steam-steerer, etc., and only influenced by the magnetism in the hull of the ship, which magnetism is acquired while the ship is building from the earth's inductive force, etc., it would be possible, by comparing the natural deviation on the north and south points with that on the east and west points, to determine pretty accurately the direction of the ship's head at the time of building. But in the way iron and steel is used in the construction of boats nowadays these conditions are seldom met with; nevertheless, there is a line of no deviation for any position that the compass may be placed in on board. It must be of necessity, for the Dev. in changing name, from Ely to Wly, or vice versa, must take place on this line.

This line must not be confused with the true neutral line of the ship's magnetism. Such a point, or line, exists in every hull, but it may be a most dangerous position for the compass, owing to the closeness of the boiler, or the engine, or some other of the ship's equipment. The behavior or action, of the compass on this true neutral line is much different from its action on the so-called neutral line. On the true neutral line the deviation is usually small; is uniform, that is, the deviation increases and decreases gradually and systematically. The earth's magnetism retains its action or control, on the compass, a good deal the same as it would when free from the ship's magnetism. With the compass in this neutral position, and the ship's head in the direction that her head lay while building, there will be no deviation. The ship's head can be turned in azimuth on either side of this, for a point or so, affecting the deviation but slightly.

In the case of the so-called neutral line, (the line where the deviation changes name), were the ship's head to be turned aside from this a degree or two the compass might go spinning, or the compass card would make it appear that the ship's head itself, had turned in azimuth some 10 or 12 degrees, whereas it might have been only two or three degrees. This is

due to the fickle and variable effects of masses of iron too close to the compass, such as the steam steerer, for instance. This unsteady or fickle condition is due to each separate or individual part of the machine having magnetism of its own, such as the frame, the gearing, the shafting, the pinions, the pistons, the connecting rods, the cranks, etc. The magnetism of each piece is not stable or fixed in amount, neither do its magnetic poles lie diametrically opposite each other, or at the ends of a straight line; for example: take any individual piece of the machine which is larger at one end than at the other; it will not have its magnetic poles in line. They will, though not necessarily, be at its extremities. Imagine some (iron) casting that is very irregular in shape, with crooks, twists and bends, with one of its ends far from a straight line to its other end; or a casting having several legs. Imagine magnetic poles at the extremities of these points and the irregular and unnatural effect it would have on the compass placed near to it. Even were these parts of the same size and thickness all the way through, their poles are not necessarily in the same straight line, nor will they necessarily be of the same strength.

There will be consequent poles (poles lying between the neutral point and the poles at the extremities of the mass). These effects may be due to the conditions of the iron or steel, its quality, strength and purity. The quality of the iron is never the same all the way through, either as to temper or strength. Neither will it acquire nor develop magnetism equally or uniformly over its surface. It is the law of magnetism that its poles are at the extremities of its mass; while this is true it is not a fact that they are the only poles of the mass nor the strongest of the mass. If it happens that a better quality of iron, as to purity, and of a greater temper, lie inside of these points, they will develop a stronger magnetism than that at the ends.

It is a well-known fact that in working iron, such as welding two pieces together, and even in its manufacture, hollow places or flaws occur, with merely an outside skin over the defective parts. It is easy to see how it is possible for a mass of pure metal to become separated from the rest, or the impure from the pure, or the intermingling of the whole, so that the entire mass is unequal as to solidity, purity, strength and temper. This being a fact its magnetic character must likewise be unequal and at variance with well-established laws. This is only

apparent since the laws of nature are correct. It depends entirely upon the condition of the substance by which the test is either made or from which it is developed.

It can readily be seen when all these individual pieces having magnetism of their own are embodied, that their effects on the compass needle as the ship swings around in a circle are abnormal and at variance with the laws of the science. Such a combination of forces, with no uniformity or regularity of action, renders the compass useless for all purposes until adjusted. Even then the most scientific methods of compass compensation are unable to cope with it so far as to overcome it wholly, or even nearly so. The compounded results from such inharmonious sources are antagonistic to all laws of reason, and the disturbing forces thus produced are of an embarrassing amount and even after adjustment large errors obstinately remain. This fickle condition of affairs gives sluggishness to the compass in some cases, and in other cases increases the compass action to such a degree as to make it wholly unreliable. In the one case the earth's and ship's magnetisms are in antagonism, and in the other case are in unity. The effects of friction on the compass are decreased in the one case and increased in the other. Other complicated disturbing forces are produced, which are only detected from observations compared with the ship's head in certain directions.

THE MANY RIVER RANGES.

From the preceding examples and tables, which show how to form a complete deviation table, it must at once appeal to the student that with the unlimited means existing all over the lakes for the performance of this work, there is little or no excuse for a man sailing a boat for not having a pretty accurate deviation table. Take for instance, the correct magnetic bearings of the various ranges in the St. Mary's river, Detroit and St. Clair rivers, Lake St. Clair, at the entrance to the many harbors, and along the shores of the various lakes. These ranges form an easy method of ascertaining the deviations, and they should be employed while in the passage up and down the lakes to form correct deviation tables for each compass on board as well as to verify and correct the old tables of deviations. Be sure to write down each bearing as you take it, and do not trust to your memory for it. There is nothing like having things down in black and white, whether it be deviation, or a man's promise.

SHIP SHOULD BE ON AN EVEN BEAM.

Bear in mind that when ascertaining the deviation by any of the methods herein laid down be sure that your vessel is beyond all magnetic influences from surrounding objects (to prevent local attraction), and that the vessel herself is equipped for the voyage, that is, anything that will cause an attraction should be in its regular place, such as boat davits, the anchor crane fore-and-aft in the mid-ship line, ventilators in their place, etc., etc. Be sure that the vessel is on an even beam (to prevent heeling error entering the deviation). This is a very important matter, for if the ship has even a slight list the deviations will not be the same as when on an even beam. The deviations may be more or less when the vessel heels than when on an even beam. The deviation is different for a starboard list than a port list for the same point of the compass. For example, supposing the deviation on north was easterly with the ship on an even beam; with a starboard heel the deviation, we will say, is easterly. If this were true then the deviation would be westerly with a heel to port. The deviation then from an even beam would be increased by a starboard list and decreased by a port list. The greater the heel the greater the heeling deviation. It is greatest on northerly and southerly courses and least on easterly and westerly courses; or the heeling deviation reaches its maximum amount on north and south and its minimum on east and west. The causes and effects of heeling deviation will be more fully explained in a chapter to follow. The student should remember what has been said of this heeling question, as he will be better able to understand what is to follow.

NOTE.—Even beam is a term employed to indicate that the ship neither heels to port nor starboard, which by the mariner is called even keel, but this last term is also used to signify that the ship draws the same depth of water fore and aft, the use of the same expression to indicate two different conditions of the ship being calculated to cause confusion. Upright is also a term that is used to indicate the same thing as even beam.

KEEP THE SHIP STEADY FOR SEVEN MINUTES.

Therefore, the water should be smooth so that the ship's rolling will not cause heeling deviation, and also not to interfere with the observer in taking the bearings and in reading the compass. See that you have a good man at the wheel, and special care must be exercised to keep the vessel perfectly steady on each course or heading. In this work a vessel should remain on each course for at least seven minutes, and ten minutes would be better. The object of keeping the ship steady on each heading (when getting the Dev.) for seven minutes is to allow the mag-

netism induced in soft iron of the ship to conform itself to each new direction. It must be understood that whenever the ship's head is changed in azimuth the soft iron in the ship undergoes a change by the earth's inductive forces, which is the real cause of this iron becoming magnetic. This stationary direction of the ship's head gives all such iron a chance to acquire its new relations, or to go through its various magnetic phases due to a change of direction; or in other words, permits the compass card to come to rest, for sometimes this iron is harder than ordinary soft iron, and therefore takes a longer time to lose or gain magnetism.

NOTE.—Not less than seven minutes on each heading should be allowed, but five will give very good results; seven or ten is better, so there will not be so much chance for an error on account of adhesive attraction.

HORIZONTAL AND VERTICAL SOFT IRON.

Now, what must be the shape of this iron to undergo such change—horizontal or vertical? It cannot be vertical iron because it remains in the same upright position, no matter what direction the ship's head may be in; but not so with horizontal iron, which changes its position as the ship swings around, and of course, must be greatest in magnetism when its direction is in one with the magnetic meridian, and least when the iron is at right angles to this meridian; in other words, when the ship's head is brought around so as to cause the ends of horizontal iron to point north and south, or near to north and south, the earth's horizontal force makes magnets of them. When the ends of this iron point east and west, or near to east and west, it loses its magnetism, since its length is at right angles to the earth's horizontal force, hence, no action can take place. Remember that it is the direction of the iron and not the direction of the ship's head.

As the ends of horizontal iron approach the magnetic meridian they begin to acquire magnetism, and this magnetism gradually increases as the meridian is approached, reaching its maximum amount when coincident with the meridian. When the ends of this iron are turned away from the meridian the iron loses magnetism and it has none when it reaches east and west. Take an iron deck beam, for instance, when the ship is heading either east or west, correct magnetic, at any place, the deckbeam lies in the magnetic meridian, and its ends are magnets by induction from the earth. As the ship's head is brought towards north or south the ends of the deckbeam take the direction of east and west and its magnetism is lost. It is in cases of this kind, when the ship is turned quickly, and only steadied for a short time on

each new direction, that this iron cannot either gain or part wholly with transient induced magnetism, as already explained.

THE IRON DECK BEAM.

Take the example of the iron deck beam again, when the ship's head is east the port end of the beam has a red pole, or one-half of it is red or north magnetism, since the magnetism of the earth is blue and the magnetism by induction must be opposite in name to the force that produced it; or the pole or end of the iron, lying next to the inducing force, must have opposite names. We know that the earth has blue magnetism, consequently, that end of the iron lying nearest to it must have an opposite polarity; and so it has. The starboard end of the beam then has blue magnetism. If the ship were heading west the starboard end of the beam would have red magnetism and its port end blue. With the ship in either of these directions the iron beam is strongest in magnetism, since its length lies in the magnetic meridian, and gets the full power of the inducing force.

With the ship's head on any heading north or south of east, the port end of the beam retains its red magnetism, but its force of power weakens gradually as the meridian is approached and it vanishes entirely on the meridian. On headings north or south of west the starboard end of the beam has red magnetism, but its intensity depends on the angle it makes with the meridian. The smaller this angle the stronger this force, and the greater this angle the weaker the magnetism of the deck beam. It must be understood that when one end has blue magnetism the other end must have red magnetism. Remember, that it is soft iron that we are talking about.

WHEN THE DIRECTIVE FORCE IS WEAK.

On some headings where the directive force is weak, a longer time than seven minutes may be required for the soft iron of the ship to lose or gain its magnetism, or for the compass card to come to rest. Where it occurs that the directive force of the compass is weak is on those courses which are on and near to the direction of the ship's head in building; in other words, the magnetic force of the ship is then in direct antagonism to the earth's directive force, which is supposed to control the action of the compass needles carrying the card. If it were only the earth's magnetism that had influence on it, there could be no deviation, since the directive force on the compass would be the same for all courses of the ship. Where the directive force of the ship and earth are combined, the force being greater the result causes deviation; where they are in opposition, the ship's force being greater than the earth's force the result is deviation.

WHEN THE DIRECTIVE FORCE IS GREAT.

Where it occurs that the directive force on the compass is increased, or is much more than it would be from that of the earth alone, is on and near the courses that are in reverse of the direction of the ship's head in building. In this instance the two forces act as one, hence the fickle and wild state of the compass.

THE OBJECT OF COMPASS ADJUSTMENT.

It is the object of compensation by magnets to relieve the compass of this inequality of directive force by equalizing it (nearly) on all courses. While this is the object of compensation (compass adjusting) it cannot always accomplish its purpose. This occurs where there is an inequality of the ship's attraction on the compass, for instance, where a compass is placed on one side or the other of the midship fore-and-aft line. Take the case of the steering compass when placed to one side of the steam steerer, the "one-sided" attraction, owing to the want of symmetry in the disposition of the mass of iron comprising the appliance, causes a large inequality of attraction on reverse points. Even where the compass is placed in the midship fore-and-aft line, if the iron around it is unequally distributed the amount of the deviation on reverse courses will not be the same. The principles of compass adjusting presuppose that the same amount of attraction or deviation, exists on reverse points.

NOTE.—When speaking of the compass being affected and influenced by the ship's magnetism, it is to be understood that the compass is uncompensated, or not adjusted. The word "uncorrected" is sometimes used to denote the same thing.

WHEN THE CARD DOES NOT MOVE WITH THE SHIP'S HEAD.

It is generally known among seamen that an unadjusted compass, in an iron or steel ship, does not, as the ship turns round, indicate the exact angle through which she has moved. Thus, in some directions of the ship's head, an actual movement through an angle of 20° may, according to the compass, be so little as 10°, or it may be so much as 30°; this difference, plus or minus, between the actual and apparent movement being in reality that portion of the total deviation which belongs to the particular angle through which the ship has moved.

WHAT THE COMPASS CARD IS SUPPOSED TO DO.

As we have already stated, the compass card is supposed to remain stationary at all times; it appears to move, but this is only apparent, for it is the ship that turns beneath it. Where the compass has deviation (attraction) the card does not appear to move (but that is just when it does) for the attraction appears to hold the card, but it really pulls

it in the same direction that the boat turns in. If the boat is swinging to the right and the compass card does not appear to move, but points out about the same direction, the deviation will be easterly, or to the right. Under the same conditions were the card to turn faster than the boat's head, the deviation will be westerly. The card must be turning the opposite way from that of the boat.

NOTE.—Another thing we wish to call attention to: The words vessel, ship, boat and steamer, are used indifferently to mean the same thing.

QUESTIONS FOR MASTERS AND MATES.—NO. 31.

460. By an azimuth of the sun you find that the Dev. on correct magnetic north is 6 degrees Ely. With this amount of Dev. how should your compass read when steady on Frying Pan and Pipe Island ranges?

461. How should this same compass read on the Ecorse range, and also on the Texas Dock range?

462. Supposing your compass reads N 3/4 W on Frying Pan and Pipe Island ranges, how much and which way is the deviation?

463. If your compass had 8 degrees Wly. Dev. on correct magnetic NW how should it read when your boat is steady on Harwood Pt. range?

464. When is a vessel on an even beam? When is she on an even keel?

465. If a compass is adjusted while a vessel is on an even beam and on an even keel, will the same adjustment answer with the ship not on an even keel? Why?

466. Will the same compass show the same readings or bearings with a vessel light or loaded? Why?

467. Why is it many times that the deviation on reverse courses in an unadjusted compass is of a different amount?

468. Can you get a magnet that will adjust a point of deviation on N. and a point-and-a-half on S? Why?

469. If you were to adjust a compass on N and S, and you had an Ely. Dev. with the ship's head correct magnetic north, which pole of the adjusting magnet would you place to starboard?

470. Name some ranges in the Sault river that are suitable for adjusting a compass on?

471. If you had 1/2-pt. Ely. Dev. on correct magnetic east, how much and which way would you expect to have it with ship's head correct magnetic west?

472. What is meant by semi-circular deviation? Why is it so-called?

473. What is quadrantal deviation?

Why is it called quadrantal deviation and what is the cause of same?

474. After the semi-circular deviation has been adjusted which way would you expect the deviation to be on NE correct magnetic?

QUESTIONS FOR WHEELSMEN AND WATCHMEN.—NO. 32.

326. Give correct magnetic course and distance from a point one mile north of old Pt. Mackinac light to North Manitou shoal gas buoy.

327. Give true course and distance from North Manitou shoal gas buoy to a point 4 miles north of Pt. Betsie lighthouse.

328. Give true course and distance from a point 4 miles north of Pt. Betsie lighthouse to Manitowoc harbor entrance.

329. Give true course and distance from a point 4 miles north of Pt. Betsie lighthouse to Sheboygan harbor entrance.

330. Give true course and distance from a point 4 miles north of Pt. Betsie lighthouse to Port Washington harbor entrance.

331. Give true course and distance from a point 4 miles north of Pt. Betsie lighthouse to Milwaukee harbor entrance.

332. Give true course and distance from a point 4 miles north of Pt. Betsie lighthouse to Racine harbor entrance.

333. Give true course and distance from a point 4 miles north of Pt. Betsie lighthouse to Kenosha harbor entrance.

334. Give true course and distance from a point 4 miles north of Pt. Betsie lighthouse to Waukegan harbor entrance.

335. Give true course and distance from a point 4 miles north of Pt. Betsie lighthouse to Chicago harbor entrance.

The foremen and officials of the Superior Ship Building Co. met socially on the evening of Feb. 7 at the Richelieu Hotel, Superior. In the unavoidable absence of Supt. Williams, Mr. John Lawson, head of the mechanical department, occupied the chair. Mr. James MacKellar, yard foreman, officiated as croupier. The speeches were along the line of furthering the work of the yard and helping various departments to work as a unit.

The steamer Wilpen will be launched at the Ecorse yard of the Great Lakes Engineering Works about March 23. Capt. Henry Peterson will bring her out and her chief engineer will be Wm. Riley.